3 ARMOURED REGIMENT

UNIT SYMPOSIUM 2024

"CONTEMPORARY CHALLENGES, INNOVATIONS AND CAPABILITY ENHANCEMENT OF ARMOUR"

"Strategy without tactics is the slowest route to victory.

Tactics without strategy are the noise before defeat."

- Sun Tzu

CONTENTS

FOREWORD BY THE COLONEL COMMANDANT

As military officers, our journey is shaped by the foundational principles instilled through rigorous training, fostering holistic development in preparation for the challenges of leadership. The Sri Lanka Armoured Corps, with its rich history and commitment to excellence, recognizes the pivotal role played by well-groomed officers in safeguarding the Nation and upholding its values. The focus on cultivating knowledge, skills, and attitudes among young officers is paramount in molding future leaders within the Sri Lanka Armoured Corps. The early years of training lays the groundwork for their ability to lead effectively and make enduring contributions to their regiments, the Corps, the Army, and the Nation as a whole.

The 'Mini Symposium' approach with its emphasis on targeted training for unit-level officers is a testament to the commitment to professional advancement, communication skill enhancement, and confidence building. These attributes are integral to the success of our officers in the dynamic landscape of military service. The theme, "Contemporary Challenges, Innovations, and Capability Enhancement of Armour," holds special significance for the Sri Lanka Armoured Corps. The discussions on this topic provide invaluable insights into the nation's security dynamics, offering a nuanced understanding of specific threats and risks. By exploring how the Sri Lanka Armoured Corps addresses challenges and embraces innovations, we would enhance combat effectiveness contributing to regional stability.

Sharing experiences fosters international cooperation, as the lessons learnt from Sri Lanka become a source of inspiration for nations confronting similar circumstances. The technological advancements and collaborations within the Corps not only contribute to military capabilities but also enrich the global understanding of effective defence strategies. Professional qualification across all dimensions propels us to thrive and distinguish ourselves in a competitive environment. As envisioned the dissemination of knowledge, particularly within the realm of Armour, our goal is to propel the professional growth of all officers. This

undertaking also seeks to preserve and nurture the ethos, traditions, and camaraderie intrinsic to cavalry officers within the Army.

In the spirit of continuous learning and collaboration, this symposium serves as a platform for intellectual exchange, ensuring the officers are well-equipped to navigate the challenges of the contemporary military landscape. May the discussions within these pages inspire and empower each officer, strengthening the collective commitment to excellence in the service of a beloved Nation.

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CAPABILITY AND READINESS OF ARMOUR

3 ARMOURED REGIMENT

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CAPABILITY AND READINESS

by
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ABSTRACT

1. Armour being the decisive arm of combat operations in anywhere in the world, its capability and readiness are indispensable in today's military landscape due to their pivotal role in safeguarding personnel, assets, and national security interests. These capabilities serve as a fortification against diverse threats, ranging from conventional warfare to asymmetric attacks and technological vulnerabilities. Providing essential protection against ballistic threats, improvised explosives, and other hazards, armour ensures the survivability of troops and critical equipment in hostile environments.

2. When considering capability and readiness of armour within the Sri Lankan military context over the years, the Sri Lankan Armed Forces have utilized armoured vehicles as a crucial component in their defense strategies, particularly during periods of conflict and internal strife. The study probes into the evolution of armour within the Sri Lankan military and discusses the future prospects and potential advancements in Sri Lanka's armour capabilities, considering modernization efforts and emerging threats. It also addresses the integration of new technologies and protective measures, to enhance the adaptability and responsiveness of the armoured units within the Sri Lankan military.

INTRODUCTION

3. Armour has unarguably shaped the landscape of military conflict throughout history, serving as an epitome of power, protection, and strategic advantage on the battlefield. From ancient times to modern warfare, the evolution of armor has mirrored the advancements in weaponry and tactics, continually adapting to meet the demands of ever-changing combat scenarios (David, 2016).

4. In recent battles across the globe, the role of armour on the battlefield has undergone a transformative evolution, combining cutting-edge technology with strategic advancements to redefine its impact in modern warfare. The utilization of advanced materials, enhanced communications systems, and sophisticated weaponry has not only fortified the survivability

of armoured units but has also amplified their agility and adaptability in navigating complex terrains (Army Technology, 2013).

5. Accordingly, during the turbulent years of the Sri Lankan insurgency, armour emerged as a pivotal component in the conflict's military strategies. Armour, comprising tanks, armoured personnel carriers, and other mechanized units, played a decisive role in shaping the course of battles across various terrains, from dense jungles to urban centers. The deployment of armoured units facilitated the government's efforts to counter the LTTE's guerilla tactics, fortifying their defenses, launching offensives, and regaining territories. This period of conflict underscored the significance of armoured warfare in asymmetric conflicts, showcasing the adaptability and effectiveness of these mechanized assets in combat scenarios.

IMPORTANCE OF ARMOUR CAPABILITY AND READINESS IN PRESENT MILITARY ENVIRONMENT

6. In the contemporary military landscape, where threats are diverse and technology evolves rapidly, the capability and readiness of armour play a critical role in ensuring the protection of personnel, enhancing operational effectiveness, and maintaining national security. Adaptability, technological advancements, and continuous readiness efforts are vital to meet the challenges posed by modern conflicts. Hence, armour capability and readiness are of paramount importance due to several reasons (Mackasey, 1988):

a. **Threat Landscape**. Modern warfare involves a diverse range of threats, including conventional, unconventional, and asymmetric threats. Armour capabilities are crucial to counter these threats effectively. From protecting against ballistic missiles to countering cyber-attacks, a robust armour capability is vital.

b. **Protection of Personnel and Assets**. Armour provides protection to military personnel, vehicles, and critical assets from various threats such as ballistic projectiles, improvised explosive devices (IEDs), and chemical, biological, radiological, and nuclear (CBRN) hazards. The survivability of troops and equipment is directly linked to the effectiveness of armour systems.

c. **Operational Effectiveness**. A highly capable and ready armoured force enhances operational effectiveness. Tanks, armoured vehicles, and protective gear not only offer defensive capabilities but also serve as offensive tools, enabling forces to maneuver in hostile environments, project power, and engage adversaries effectively.

d. **Deterrence and Security Assurance**. The presence of a well-equipped armoured force acts as a deterrent, dissuading potential adversaries and enhancing national security. It provides assurance to allied nations and supports peacekeeping missions by projecting a credible defense capability.

e. **Adaptability and Flexibility**. Modern armour capabilities are increasingly adaptive and flexible. They incorporate advanced technologies such as composite materials, reactive armour, active protection systems, and integrated sensor networks. These innovations improve agility, reduce vulnerabilities, and enhance survivability in dynamic combat scenarios.

f. **Information Warfare**. Armour capability extends beyond physical protection; it also includes cyber resilience and electronic warfare readiness. Protecting critical information, communications, and networked systems from cyber threats is as crucial as physical armour in today's interconnected battlefield.

g. **Humanitarian and Disaster Response**. Armoured capabilities are not only essential in combat but also play a vital role in humanitarian and disaster relief operations. Armoured vehicles can provide secure transportation, aid in search-and-rescue missions, and support logistics in hostile environments.

h. **Training and Maintenance**. Readiness involves continuous training and maintenance of armour systems. Regular training ensures that personnel are proficient in operating advanced equipment, while proper maintenance guarantees the reliability and functionality of armour assets when deployed.

CAPABILITY AND READINESS IN GLOBAL CONTEXT

7. Research on armour capability and readiness encompasses a broad range of topics related to the effectiveness, functionality, and preparedness of armour used in various fields

such as military, law enforcement, personal protection, and more. Armoured warfare has been a pivotal aspect of modern military strategies, involving the use of its vehicles to gain tactical advantages on the battlefield. The capabilities and readiness of armour developed armies encompass a range of factors, including technological advancements, training, doctrine, and the integration of various units and equipment (Antil, 2017).

Technological Capabilities:

a. **Advanced Armour and Vehicles and Technical Integration.** Modern armies invest in state-of-the-art armoured vehicles equipped with composite armour, reactive armour, and other advanced protection mechanisms to withstand various threats on the battlefield. The developed armies have been investing heavily in modernizing its armoured vehicles and equipment, integrating advanced technologies such as improved armour materials, active protection systems (APS), enhanced firepower, and digital systems for better situational awareness and communication.

b. **Firepower.** These armoured vehicles are armed with sophisticated weaponry, including main guns, secondary weapons, anti-tank guided missiles, and remotely operated weapon systems, providing formidable firepower.

c. **Mobility.** Agility and manoeuvrability are crucial. Tanks and other armoured vehicles are designed for high mobility across different terrains, enabling rapid deployment and swift movements during combat operations.

d. **Protection.** The primary function of armoured vehicles is to protect soldiers and assets. The modern armies have been working on enhancing the protection levels of its armoured vehicles against a wide range of threats, including improvised explosive devices (IEDs), anti-tank weapons, and small arms fire.

e. **Sensors and Communication.** Integration of advanced sensors, communication systems, and targeting technologies enhance situational awareness, allowing for better coordination and effective engagement of targets.

Readiness Factors:

a. **Training and Expertise.** Personnel undergo rigorous training to operate and maintain armoured vehicles effectively. This includes simulated exercises, live-fire

drills, and scenario-based training to enhance combat readiness. The Army places a significant emphasis on training its personnel to operate and maintain armoured vehicles effectively. Regular training exercises, simulations, and drills are conducted to ensure readiness for combat situations.

b. **Logistics and Support.** Maintenance, repair, and logistical support are critical for sustaining armoured units. Efficient supply chains and support structures ensure vehicles remain operational during extended deployments.

c. **Modernization Initiatives.** The modern Armies have ongoing modernization programs aimed at upgrading existing armoured platforms and developing new ones to maintain a technological edge over adversaries. Programs like the Next-Generation Combat Vehicle (NGCV) are part of this initiative.

d. **Doctrine and Strategy.** Armoured warfare doctrine evolves to adapt to changing threats and environments. This includes tactics for offensive manoeuvres, defensive operations, combined arms coordination, and integration with infantry and other support units.

e. **Strategic Adaptability and Flexibility.** The Army continually assesses and adapts its armoured capabilities to meet evolving threats and changing geopolitical landscapes. This adaptability ensures that armoured units remain effective and relevant in various operational environments. Armoured forces must remain adaptable to varied combat scenarios. This includes the ability to swiftly adjust tactics, respond to unexpected threats, and operate in diverse landscapes.

Integration and Coordination:

a. **Combined Arms Operations.** Armoured units work in tandem with infantry, artillery, air support, and other branches of the military for comprehensive battlefield effectiveness.

b. **Joint Operations.** Coordination with other military branches and forces is crucial for successful joint operations, utilizing each unit's strengths to achieve strategic objectives.

c. **Command and Control.** Effective command structures ensure seamless communication and coordination between units, enabling rapid decision-making and response during combat situations.

Challenges and Future Developments:

a. **Technological Advancements.** Continued research and development to enhance armour protection, firepower, and mobility while integrating emerging technologies like AI, drones, and unmanned vehicles.

b. **Adapting to Asymmetric Threats.** Addressing unconventional threats such as guerrilla warfare, cyber-attacks, and urban warfare scenarios where traditional armoured units might face challenges.

c. **Logistical Challenges.** Balancing the need for heavy armour with logistical constraints, such as transportation, fuel consumption, and maintenance, to ensure sustained operational capabilities.

8. Therefore, the capabilities and readiness of armoured developed armies involve a holistic approach encompassing technological advancements, training, readiness factors, integration with other units, and the ability to adapt to evolving threats and environments to maintain a robust and effective military force.

LIMITATIONS OF FIGHTING FUTURE ARMOURED WARFARE

9. As warfare evolves, so does the technology and equipment used in combat. While armour has historically been crucial for protecting soldiers, there are limitations to its effectiveness in future warfare scenarios (Antil, 2017).

a. **Vulnerability to Advanced Weaponry.** Modern and future warfare increasingly involve advanced weaponry such as precision-guided munitions, drones, cyber-attacks, and even directed energy weapons. Traditional armour may struggle to defend against these high-tech threats, rendering it less effective or obsolete.

b. **Weight and Mobility.** Traditional armour tends to be heavy, limiting soldier's mobility and agility. In future warfare, where rapid movement and agility are crucial, heavy armour might become a liability, making soldiers slower and more susceptible to being out maneuverer by agile adversaries.

c. **Adaptability and Versatility.** Future conflicts might occur in diverse environments, from urban landscapes to dense forests or mountainous regions. Armour designed for specific terrains might lack adaptability in rapidly changing battle conditions, leaving soldiers exposed in certain scenarios.

d. **Stealth and Camouflage.** As technology advances, stealth capabilities become increasingly important. While armour protects soldiers, it can also make them more visible and less stealthy. Finding a balance between protection and stealth will be crucial in future warfare.

e. **Cost and Resource Limitations.** Developing and producing advanced armour technologies can be expensive. Balancing the cost-effectiveness of producing advanced armour with other military priorities might become a challenge for military budgets.

f. **Cybersecurity Concerns.** Future armour might integrate technological components susceptible to hacking or cyber-attacks. This vulnerability could compromise soldiers' safety if adversaries can exploit weaknesses in the armour's technological systems.

10. Future warfare will likely demand a balance between protection, mobility, adaptability, and technological integration. Innovations in materials science, nanotechnology, and advanced manufacturing may pave the way for more effective and versatile armour solutions, but addressing these limitations will remain a key challenge in the development of future combat gear.

OPPORTUNITIES OF FIGHTING ARMOUR IN FUTURE WARFARE

11. The concept of fighting armour in future warfare encompasses a range of technological advancements and strategic considerations that revolve around enhancing the protection, mobility, and combat capabilities of soldiers and military assets. There are several

opportunities and developments in this field that could shape the future of warfare (Hogg, 1980):

a. **Advanced Materials and Nanotechnology**. The use of advanced materials, such as nanomaterials, metamaterials, and composites, can significantly improve the strength-to-weight ratio of armour. These materials offer enhanced protection against various threats while ensuring agility and flexibility for soldiers and vehicles.

b. **Exoskeletons**. Exoskeletons are wearable robotic systems that can augment a soldier's physical capabilities. They provide increased strength, endurance, and resilience, allowing soldiers to carry heavier loads, move faster, and operate effectively in challenging environments.

c. **Integrated Sensors and Connectivity**. Future armour is likely to incorporate sophisticated sensor systems that provide real-time situational awareness. This could include integrated cameras, infrared sensors, and other technologies to detect threats and provide critical information to soldiers and command centres.

d. **Adaptive and Reactive Armor**. Adaptive armour systems can automatically adjust their properties in response to incoming threats. Reactive armour, for instance, can detonate explosive materials to counter incoming projectiles, thereby minimizing damage to the vehicle or soldier.

e. **Directed Energy Weapons (DEWs)**. The development of DEWs, such as lasers and high-powered microwaves, offers potential in countering threats. These weapons could be integrated into armour systems to provide offensive and defensive capabilities, targeting enemy assets effectively.

f. **Artificial Intelligence (AI) and Robotics**. AI-driven systems can optimize defense strategies, enhance decision-making processes, and enable autonomous or semi-autonomous operations of armoured vehicles or unmanned systems, reducing the risk to human soldiers.

g. **Cybersecurity Measures**. As warfare becomes increasingly digitized, ensuring the cybersecurity of armour systems will be crucial. Robust encryption, firewalls, and secure communication protocols will be essential to prevent hacking or infiltration of critical military systems.

h. **Biotechnological Advances**. Research into biotechnology might lead to developments in creating "living armour" inspired by biological systems. This could involve self-healing materials or incorporating biological elements for enhanced resilience.

i. **Environmental Adaptability**. Future armour must be adaptable to various terrains and environmental conditions. Whether it's extreme heat, cold, underwater operations, or navigating rugged landscapes, armour systems should be versatile enough to operate effectively across diverse settings.

12. The opportunities for fighting armour in future warfare are vast and multifaceted, integrating cutting-edge technologies to enhance protection, mobility, and combat effectiveness while addressing ethical and strategic implications. These advancements are continuously evolving, driven by ongoing research, innovation, and the changing nature of modern conflict.

INTRODUCTION TO SRI LANKA ARMOURED CORPS

13. Sri Lanka Armoured Corps (SLAC) which was raised as a reconnaissance squadron in 1955 has come a long way as of now and has been developed to become a fully-pledged combat arm having inherited enormous amount of experiences in various engagements of the country. It has evolved a rich value base of its own engagements and the persistent regimentation culture have been able to produce and unique conceptual base in armoured warfare. The armoured component provides the army with absolute versatility to perform across the spectrum of operations. A composite land force also will provide much needed deterrence despite the size of force. Considering Sri Lanka's land mass, terrain configuration and geo-strategic worth, it needs to be comprehended that Sri Lanka Army should maintain its capability by equipping, maintaining and modernizing an appropriate AFV inventory. The size of this force as envisioned by the Sri Lanka Army Way Forward Strategy 2020-2025 is two brigades. The

threat perception and operational tasks envisaged by the doctrinal component of the Army also dictates that two-brigade size Armoured component need to be maintained by the Sri Lanka Army (Sri Lanka Armoured Corps, 2023).

CHANGING THREAT PERCEPTION AND ROLE OF ARMOUR IN SRI LANKA

14. In recent years, Sri Lanka has encountered a paradigm shift in its security landscape, witnessing the emergence of a spectrum of non-traditional threats that pose significant challenges to its stability and resilience. Beyond conventional security concerns such as territorial disputes and internal conflicts, the island nation grapples with a complex array of non-traditional threats that transcend borders, ranging from cyber warfare and information manipulation to environmental degradation, pandemics, and socioeconomic vulnerabilities. The interplay of these multifaceted challenges has reshaped the security dynamics in Sri Lanka, demanding a comprehensive re-evaluation of traditional security approaches. In this context, understanding and addressing these non-traditional threats have become imperative for safeguarding the nation's sovereignty, social harmony, economic prosperity, and overall well-being of its populace (Kumara, 2015).

15. In response to these shifting threats, the role of armoured assets has gained prominence in Sri Lanka's defense framework. Armoured vehicles, including tanks, personnel carriers, and other specialized equipment, have become integral components of the country's defense architecture. These assets are instrumental in providing both offensive and defensive capabilities, offering enhanced protection to military personnel and enabling swift responses to emerging threats. Moreover, advancements in armour technology have further augmented their significance, enabling adaptability to diverse terrains and combat scenarios, thereby bolstering Sri Lanka's preparedness in addressing multifaceted security challenges (Kumara, 2015).

PRESENT FLEET OF THE SRI LANKA ARMOURED CORPS

16. The essence of any cavalry outfit is its AFV fleet. SLAC had to face off its British AFV inventory during the early stages of the 2nd Eelam War (1991), with the induction of Chinese tracked AFVs (T – 85 and T – 89) which also marked the SLAC's transition from wheeled AFVs to Tracked AFVs induction of Czech T – 55 MBTs, BTRs and Chinese T 63 – 2s and

WMZs, further strengthened the Army's iron fist. Following aspect could be derived by analysing data pertaining to AFV fleet in the SLAC (Sri Lanka Armoured Corps, 2023):

a. T – 55 MBTs and BTRs/WMZs are the mainstay of Sri Lanka Army's Armoured component.

b. T – 55 MBTs is obsolete tank by world standards and the production has been discontinued including ammo production (100mm version).

c. BTRs are still battle worthy and a proven AFVs, but need to be repaired or overhauled to give life extension.

d. WMZ 551 A is a relatively new and modern AFV, this can be used for another 15 to 20 years with required repairs.

e. BMPs II AFVs need to be repaired/overhauled as they can be used for another 15 to 20 years.

f. T 63 – II APCs are still serviceable, yet they need repairs to keep them in service.

g. BMP I and T – 86 (T) are similar in design but from two different countries. Both 73 mm main gun which is considered as an obsolete weapon system.

h. T 85 Chinese AFVs are belonging to the first generation of track vehicles inducted to the Army in 1991, due to the ageing their spares and specially ammo 973 mm) are difficult to find.

i. All AFVs of British origin can only be used for ceremonial purposes.

j. All AFVs need a stock of essential spare parts.

k. In total following is the AFV state of the SLAC (excluding ceremonial, AVLB, ARV):

(1)	MBTs	- 62 x Svc and 05 x U/S (Tot 67)
(2)	Other AFVs (Except ceremonial)	- 51 x Svc and 21 x U/S (Tot – 72)
(3)	Grand Total	- 139

PRESENT FORCE STRUCTURE OF THE SRI LANKA ARMOURED CORPS

17. Sri Lanka Armoured Corps is consisted with Regimental Centre, Amoured Brigade, Armoured Corps Training Centre (ACTC), four classic regiments and two RFT regiments. As of now, the four classic regiments (1st Recconaissance Regiment, 3rd Armoured Regiment, 4th Armoured Regiment and 5th Recconaissance Regiment) are kept under command to the AHQ as a reserve as a part of the armoured Brigade. Two RFT regiments (6th RFT regiment and 7th

Volunteer regiment) are kept under command to field formations to perform infantry duties. Even classis regiments are currently performing infantry duties under various field formations (Sri Lanka Armoured Corps, 2023).

PRESENT DEPLOYMENT OF ARMOUR ASSETS

18. All classic regiments including its assets, other RFT regiments and ACTC deployed across the island covering every Security Forces Headquarters to encounter any threat and react swiftly are as follows:

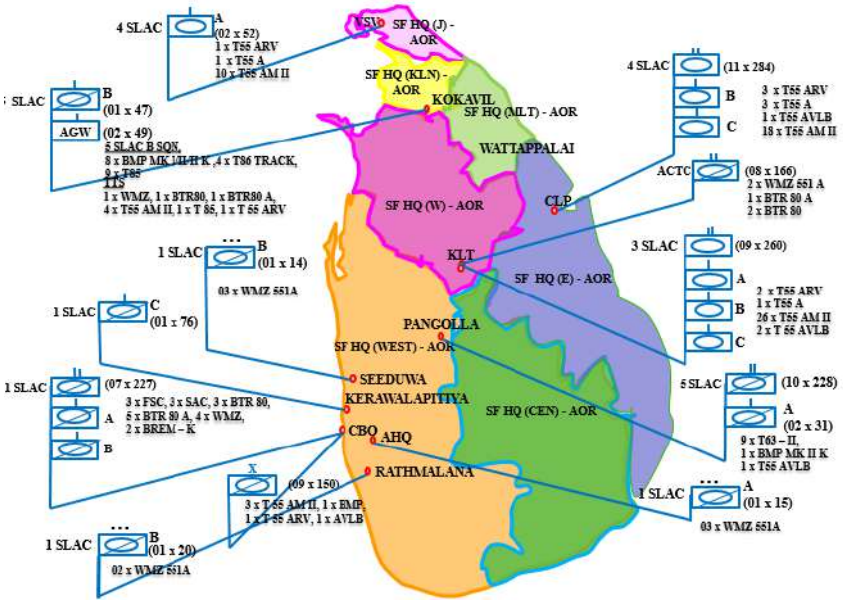

Figure 1 : Deployment of Armour Assets.

TRAINING

19. The Armored Corps Training Centre is an essential institution within the Sri Lankan military and serves as the primary training hub for the SLAC, which dedicate to train officers and Other Ranks. Training programms cover a wide range of subjects, including armoured warfare tactics, techniques and procedures, basic and advanced tank courses covering auto, gunnery and communication aspects, B vehicle courses, vehicle maintenance and leadership skills specific to armoured warfare. Further, ACTC focuses on honing the skills required for operating and maintaining armored vehicles effectively. This involves practical exercises,

simulations, and classroom instructions. Some of courses which are designed at ACTC are as follows:

a. Young Officers Course
b. Basic Tank Driver/Operator Course
c. Class I Driver/Operator Course
d. B Vehicle Course
e. BTR Driver/Operator Course
f. Instructor Course
g. Tank Commander Course
h. Leadership Course
i. Promotion Course
j. Courses for clerical Staff

20. Further, Officers and Other Ranks are getting opportunities to follow different courses in foreign countries in order to enhance their knowledge and command and leadership capabilities. Some of the courses are as follows:

a. Young officers Course
b. Instructor Course
c. Combat Team Commander Course
d. Combat Group Commander Course
e. Maintain and Management Wheeled Armoured Equipment Course
f. Maintain and Management Tracked Armoured Equipment Course
g. Armour Intermediate Command Programme
h. Battalion Commander Course

MODERNIZING THE FLEET OF THE SRI LANKA ARMOURED CORPS

21. As the Sri Lankan Army still holds a considerable fleet of armour, overhauling and repairing of the existing fleet will help to extend the serviceability for another considerable period of time. SLAC has projected following modernizing requirements.

a. **T 55 MBT**. Many countries have modernized the T 55 tank with the better power package, fire and protection system to suit the modern demands. Following upgrades need to be done when opting for life extention:

(1) It is mandatory to up-gun with 105 mm or bigger caliber since 100 mm gun in now ineffective due to unavailability of 100 mm ammo.

(2) Protection levels are below the current battlefield demands and need to be upgrade.

(3) Fire control system, site configuration and NVDs are obsolete and required to match with the new system

(4) Communication system to be upgraded.

b. **Other AFVs**. All other AFVs like BTR80 and 80 A, WMZ 551 A, T – 63 – II, T – 85 and T 86 (T) and BMPs II need to be upgraded with required repairs/overhauling which can be served for another considerable period of time.

c. Two RFT regiments need to equip in order to form two Armoured brigades that would enhance the operational readiness considering the future threat perception.

FUTURE CONSIDERATIONS TO DEVELOP CAPABILITY AND READINESS

22. It's important to note that the specifics of an armoured regiment's capabilities and readiness can vary significantly based on the country's military doctrine, available resources, geopolitical factors, and ongoing operational requirements. Hence, SLAC should more focus on following areas to enhance capability and readiness.

a. **Equipment and Vehicles.** Since SLAC typically possess variety of very old AFVs and APCs including other support vehicles which most of them are obsolete by many countries, these existing fleet should be upgraded focusing modern demands and should reach acquiring minimum 3rd generation of AFVs or modern acquisitions.

b. **Training and Expertise.** The effectiveness of an armoured regiment relies heavily on the training and expertise of its personnel. Sri Lankan armoured units undergo rigorous training in vehicle operation, maintenance, tactical manoeuvring, and combat operations. Training should be more focused on individual and collective training and field exercises such as squadron training. Further, it is highly important to conduct simulator-based training to enhance the capacities of officers and soldiers as SLAC is struggling to find resources and space for required training amidst present economic situation.

c. **Operational Readiness.** Operational readiness is a critical aspect of any armoured regiment. This involves the regiment's ability to rapidly deploy, manoeuvre, and engage in combat operations effectively. Hence, deployment of troops and equipment and equipment maintenance, logistical support, and the ability to respond swiftly to any contingency or threat should be carried out based on contemporary and future threats.

d. **Modernization and Upgrades.** Armoured units constantly evolve to keep pace with technological advancements and changing battlefield scenarios. SLAC should carry out modernization and upgrading of its armoured vehicles and equipment to enhance their fire power, protection and manoeuvre capabilities.

e. **Integration with Combined Arms.** SLAC should focused its training and combat operations integrating with other combined arms such as infantry, artillery, and other support units. The ability to coordinate and integrate with these units is crucial for mission success.

f. **Combat Experience.** As SLAC has played a vital role in recent military operations has gained valuable combat experience which could have shaped their tactics, strategies, and operational readiness to get better results when dealing with future warfare.

g. **Personnel and Morale.** The morale and dedication of personnel within the armoured regiment are vital. High morale is often associated with better combat effectiveness. Factors such as individual and collective training, improve command and leadership abilities, welfare, leadership, and motivation contribute significantly to this aspect.

h. **Strategic Importance.** In the Sri Lankan context, the armoured regiment plays a crucial role in the country's defense and security strategy, especially considering past internal conflicts and ongoing security concerns. Further SLAC contributes its fully capacity for UN mission contingencies as combat experienced army. Therefore, modifications, modern acquisitions and rigorous training of SLAC should be developed focusing on UN mission opportunities.

CONCLUSION

23. The effectiveness of armour capability and readiness is pivotal in ensuring the safety and operational success of military personnel. Through constant innovation, rigorous training, and the integration of advanced technologies, armour capabilities have evolved significantly, providing enhanced protection, mobility, and versatility on the battlefield.

24. A well-equipped and well-prepared armour force plays a critical role in deterring threats, maintaining strategic superiority, and safeguarding national interests. It serves as a formidable asset in both offensive and defensive operations, offering a vital layer of defense against various conventional and asymmetrical threats.

25. A robust armour capability and readiness posture are indispensable for modern military forces. Therefore, Sustained commitment to innovation, training, and maintaining a state of readiness of SLAC ensures that armoured units remain a decisive and formidable component of national defense strategies, effectively safeguarding against emerging threats while maintaining operational readiness across diverse and dynamic conflict scenarios.

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CONTEMPORARY CHALLENGES

by

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INTRODUCTION

1. The Sri Lanka Armoured Corps, with its rich history and esteemed reputation, has been an integral part of the nation's defence for many years. It is home to some of the best officers and men, along with an arsenal of potential equipment. However, in recent times, the Corps has been facing various challenges that have impacted its efficiency and effectiveness. In order to overcome these hurdles and ensure the continued success of the Armoured Corps, a serious and comprehensive analysis is required. By identifying and understanding these challenges, the necessary solutions can be identified and implemented, paving the way for a more capable and efficient Sri Lanka Armoured Corps.

2. In this comprehensive study, the focus will be on highlighting the challenges faced by the Sri Lanka Armoured Corps in the present operational environment. However, before delving into the specific challenges that pertain to the Armoured Corps, it is crucial to understand the broader issues that the Sri Lanka Army as a whole is facing. These broader challenges provide a necessary context for comprehending the specific challenges faced by the Armoured Corps.

3. By examining the broader Army challenges, this study aims to establish a foundation for understanding the core issues that lie behind the contemporary challenges faced by the Armoured Corps. Identifying these core issues is essential for finding effective solutions that can enhance the overall standards of the Corps and ensure its long-term sustainability as a formidable combat arm.

4. The study will analyse the challenges faced by the Sri Lanka Armoured Corps within the framework of the broader Army context. This approach will enable a comprehensive understanding of the unique obstacles and constraints that affect the Armoured Corps, ultimately leading to targeted solutions and strategies to overcome these challenges.

OBJECTIVES OF THE STUDY

5. In this study, we will provide a brief overview of the challenges faced by Sri Lanka Army as a whole and then delve into a more detailed analysis of the specific challenges encountered by the Sri Lanka Armoured Corps. By examining these challenges in depth, it is aimed to gain a comprehensive understanding of the unique obstacles faced by the Armoured Corps and explore potential solutions and strategies to address them in subsequent studies. While acknowledging the wider national and army-level challenges, this analysis will give primary attention to the challenges unique to the Sri Lanka Armoured Corps and delve into them in detail, as understanding the strategic level is crucial for effectively addressing the challenges specific to the Sri Lanka Armoured Corps and ensuring its optimal functioning within the broader framework of national security.

CHALLENGES TO THE ARMY

6. The Sri Lanka Army is currently facing a range of challenges that require careful consideration and strategic planning. Firstly, the threats posed by non-traditional adversaries are growing in magnitude and complexity. These threats necessitate specialized preparation, training, and expertise to effectively counter. Additionally, conceptual changes in doctrines and the acquisition of extra resources are essential to adapt to these evolving challenges.

7. Secondly, economic constraints have resulted in inadequate funds for the Sri Lanka Army, which has hindered its expected progression and capability enhancement. Insufficient financial resources limit the Army's ability to modernize its equipment, infrastructure, and training facilities, thereby impacting its overall effectiveness.

8. Furthermore, the Sri Lanka Army faces excessive demands from various government organizations and the civil sector for involvement in different projects. While contributing to national development is important, these demands can strain the Army's resources and divert its attention from its primary role of defending the nation.

9. Another significant challenge is cadre retention and limited recruitment. Economic and social factors have contributed to attrition within the Army. The allure of better job prospects outside the military, coupled with limited career advancement opportunities and the demanding nature of military service, has led to a decrease in the retention of experienced personnel.

Addressing this issue is crucial to maintaining a capable and experienced workforce within the Army.

10. Addressing these challenges requires careful planning, conceptual changes, and a comprehensive understanding of the limitations and constraints faced by the Army. Any innovations or growth initiatives planned by the Sri Lanka Armoured Corps must take into account the limitations and challenges faced by the Sri Lanka Army. By doing so, the Sri Lanka Armoured Corps can overcome these obstacles and maintain a strong and capable combat arm.

CHALLENGES TO THE SRI LANKA ARMOURED CORPS

11. Military effectiveness is the standard by which the Army is judged in peace and war. It can be explained through the concept of fighting power, which is the Army's ability to fight and win battles. In turn, those three components; physical component, conceptual component and moral components also remain the three standing pillars that measure the effectiveness of the Sri Lanka Armoured Corps as well.

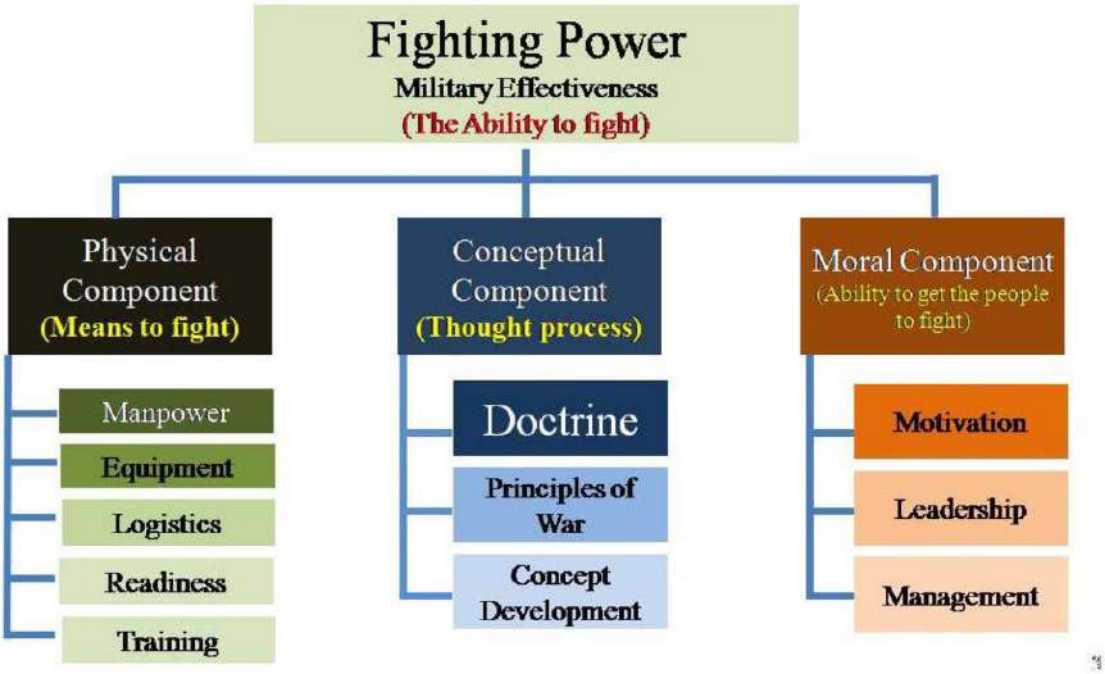

Figure 1: Concept of Fighting Power

12. The physical component refers to the tangible capabilities and resources that the army possesses. This includes the number and quality of troops, their equipment, technology,

logistical support, readiness and training. The physical component directly impacts the army's ability to wage combat operations effectively. Adequate training, modern weaponry, and up-to-date equipment contribute to the physical component's effectiveness. The Sri Lanka Armoured Corps investment in maintaining a strong physical component, through regular training with quality troops and upgrading equipment, ensures its combat readiness and operational success.

13. The conceptual component involves the army's understanding of strategy, tactics, and doctrine. It encompasses the ability to effectively plan and execute military operations based on sound principles and a deep understanding of the operational environment. The conceptual component requires well-trained and competent men who can analyse situations, develop effective strategies, and adapt to changing circumstances. By nurturing the conceptual component, the Sri Lanka Armoured Corps also can efficiently leverage its resources and capabilities to achieve its objectives and outmanoeuvre adversaries on the battlefield during the conflict and employ and contribute effectively to any non-operational requirement during any demanding situation.

14. The moral component which is intangible in nature, relates to the spirit, motivation, leadership and resilience of the army's personnel. It encompasses aspects such as discipline, morale, esprit de corps, and the will to fight. This component requires well-trained, competent and effective leader who can effectively groom and lead men during adverse circumstances. The moral component also plays a significant role in shaping the overall effectiveness of the Sri Lanka Army. High morale and a strong esprit de corps can boost soldiers' determination, endurance, and loyalty, making them resilient in the face of adversity. Conversely, low morale and a lack of motivation can undermine its effectiveness and hinder its ability to achieve success even with significant physical and conceptual capabilities.

15. In conclusion from the Sri Lanka Armoured Corps perspective, the physical, conceptual, and moral components of fighting power are intertwined and collectively contribute to the overall effectiveness of the corps. Balancing and nurturing these components ensures that the Sri Lanka Armoured Corps remains capable, adaptable, and determined in the defence of the nation's interests. Most importantly, anything which challenges these three components inevitably affects the overall performance of the Sri Lanka Armoured Corps.

16. Thus, this chapter focuses on the challenges affecting the overall performance of the Sri Lanka Armoured Corps under these three components of fighting power in order to elucidate its relevance to the fighting power.

17. The challenges faced by the Sri Lanka Armoured Corps can be categorized and tabulated under these three components of fighting power. By analysing and addressing these challenges within each component, the Armoured Corps can enhance its capabilities and optimize its performance in all domains. This analysis can then inform targeted strategies and solutions to mitigate these challenges and enhance the overall effectiveness of the Armoured Corps with feasible innovations.

Ser	Physical Component	Conceptual Component	Moral Component
1.	**Need for upgrade / procure new equipment** (upgrade of tanks / upgrade of communication equipment / purchasing of adequate equipment to RFT regiments)	**Inappropriate employment of Armour** (RFT role)	**Less career progression** (no adequate time to groom within the regiment /no adequate vacancies to command regiments / marginalisation of some trades with less career progression)
2.	**Training and skill development** (shortfall of training areas, fuel and ammo / less fund allocation / issues of relieving troops for training / less priority for crew and squadron training / less feasibility for on job training / limited foreign training / limited training infrastructure including simulators)	**Responding to non-traditional threats and employability of Armour during peace** (less demand for track armour during peace and non-traditional threats including natural disasters / social uprising / drug trafficking etc..)	**Leadership and command challenges** (no practice of mission command / zero error fallacy / inadequate resources and authority)
3.	**Logistics challenges** (inadequacy of POL for	**Lack of integrated operations**	**Cadre retention** (attractive job

	routine maintenance / shortfall of spare parts / less maintenance support / infrastructure)	(interoperability and skills to operate with infantry, artillery and air)	opportunities in the civil sector / less job satisfaction / work life balance issues / lack of professional growth / less social recognition / less living standards at work / bad leadership / lack of appreciation)
4.	**Limited Recruitment** (no social recognition / attractive job opportunities in the civil sector)		

Table 1: Challenges to the Sri Lanka Armoured Corps

PHYSICAL COMPONENT

18. Within the Physical Component, several challenges exist in the Sri Lanka Armoured Corps that require attention and solutions. These challenges include the need for upgrading or procuring new equipment for the existing tank fleet, training and skill development of its men, logistics challenges, and limited recruitment. Addressing these issues is necessary to ensure the Corps remains well-equipped, trained, and supported in its operations. By examining and addressing these challenges, the Armoured Corps can enhance its physical readiness and effectiveness in the field.

NEED FOR UPGRADE/PROCURING NEW EQUIPMENT

19. The Sri Lanka Armoured Corps faces a pressing need for new equipment or upgrades to its existing tank fleet to effectively combat the contemporary threats. The current tank fleet may be outdated, lacking modern advancements that are necessary to counter evolving challenges on the battlefield or dealing with non-traditional threats. By investing in new equipment or upgrading the existing fleet, the Armoured Corps can ensure that it possesses the capabilities required to handle current and future threats.

20. Upgrading the tank fleet is essential as technology and warfare tactics continually evolve. Modern tanks equipped with advanced armour, firepower, mobility, communication and surveillance systems provide a significant advantage in combat scenarios. With upgraded tanks, the Armoured Corps can effectively engage and neutralize adversaries, enhancing its operational effectiveness.

21. Additionally, the acquisition of new equipment for the RFT regiments is essential. The 6th Regiment SLAC and the 7th (V) Regiment SLAC being cavalry, also require specific equipment tailored to its unique classic role. Unless they are given equipment for their relevant trade, the career progression of the Officers and Other Ranks of these regiments are questionable and it affects their morale enormously. By procuring new equipment, the RFT regiment's capabilities can be enhanced, enabling them to practice and groom in their own arm effectively.

22. Furthermore, communication equipment available within the tanks should be reconsidered. It is vital for the tanks and infantry units to have compatible communication systems to ensure seamless coordination and effective joint operations. Outdated radio sets in the tanks may not be compatible with the communication systems used by infantry units. Cougar radios sets available at tanks are no longer used by the infantry and future infantry communication seems to be depending on the radio sets donated by the Chinese grant. By investing in compatible and reliable communication equipment, the Armoured Corps can enhance inter-unit communication, enabling effective coordination and synchronization of operations.

23. Overall, the need for new equipment or upgrades in the Sri Lanka Armoured Corps is essential to align with contemporary threats and maintain combat effectiveness. By investing in modern tanks, upgrading the existing fleet, acquiring new equipment for the RFT regiments, and ensuring compatibility in communication systems, the Armoured Corps can enhance its capabilities, adapt to evolving threats, and effectively contribute to national security and defence.

TRAINING AND SKILL DEVELOPMENT

24. Training and skill development in the Sri Lanka Armoured Corps has indeed faced numerous challenges. The priority that was given to the military during the war, especially prior to 2009, has diminished, resulting in a decrease in the allocation of resources and facilities for training purposes. This has had a direct impact on the effectiveness of training programme within the Armoured Corps.

25. One significant challenge lies in the allocation of training areas and ranges for firing. With current constraints, finding suitable and sufficient training areas has become increasingly difficult. Limited access to firing ranges also hampers the ability to practice and hone essential combat skills. The lack of priority in allocating training areas deprives the Armoured Corps of crucial opportunities to conduct live-fire exercises, which is vital for maintaining proficiency and readiness.

26. Additionally, lack of an adequate stock of 100 mm ammunition poses a significant challenge for training. This shortage of ammunition limits the opportunities for gunners to practice and refine their skills, hindering their ability to effectively operate and engage targets with this main weapon system. Furthermore, the absence of an adequate number of other tank ammunition also significantly impacts training within the Armoured Corps.

27. Overcoming these challenges requires a comprehensive approach. Efforts should be made to identify or establish suitable ranges where the 100 mm main gun can be fired safely and effectively. Additionally, addressing the shortage of ammunition and ensuring an adequate stock for training purposes is crucial. Insufficient fund allocation for training is another challenge. This limitation affects various aspects of training, including fuel allocation. The inability to secure adequate funding hinders the ability to conduct realistic and comprehensive training exercises.

28. Moreover, the reluctance to relieve troops from under command headquarters for training purposes poses a serious issue. Mission responsibilities often take precedence over training, leading to a lack of essential training opportunities for personnel. This hampers their ability to enhance and refine their skills through dedicated training programmes.

29. Squadron and crew training, which are fundamental for the Armoured Corps, has not been given adequate priority. With limited time and resources, training priorities might be shifted to meet operational and other administrative requirements, affecting the thoroughness and effectiveness of squadron and crew training.

30. Another challenge is the minimal training infrastructure available at regiments and training institutions. The scarcity of training areas and equipment necessitates the need for simulators or alternative training methods. Investing in simulators can provide a cost-effective yet realistic training environment, compensating for the lack of training resources and facilities.

31. Lastly, since there has been no significant on-the-job training for the Sri Lanka Armoured Corps after the war, there is a critical need for realistic training. Real-life scenarios and field exercises are essential to simulate operational conditions and enhance the skills and decision-making abilities of personnel.

32. To overcome these challenges, it is crucial to prioritize and allocate sufficient resources, including funding, training areas, and simulators, to enhance training and skill development within the Armoured Corps. Placing a renewed emphasis on realistic training and creating a conducive training environment will help to enhance the efficiency, readiness, and operational effectiveness of the Sri Lanka Armoured Corps.

LOGISTICS CHALLENGES

33. The Sri Lanka Armoured Corps faces significant logistic challenges due to inadequate fuel, lubricants, and spare parts for routine maintenance of tanks. The successful operation and longevity of armoured vehicles heavily rely on fuel, lubrication, and proper regular maintenance. However, the limited availability of these essential resources hampers the Armoured Corps' ability to effectively sustain its fleet.

34. Insufficient fuel and lubricant allocation for the tanks poses a major challenge. Tanks require large quantities of fuel and lubricants to operate, and with inadequate supply, the Armoured Corps may face limitations in conducting training exercises and daily maintenance.

This not only impacts the mobility and operational readiness of the tanks but also restricts the opportunity for crews to practice essential skills.

35. The shortage of spare parts for routine maintenance also poses logistic challenges. Tanks require regular maintenance and replacement of worn or damaged parts to ensure the operational readiness. Out dated tank fleet not only reduced the operational effectiveness but also the availability of spare parts in the international market. However, lack of adequate spare parts can lead to delays in repairs, resulting in extended periods of downtime for tanks. This hampers the ability to maintain a high level of availability and negatively impacts the Armoured Corps' operational effectiveness.

36. Furthermore, the insufficient infrastructure for troops and their well-being is a vital concern. Well-maintained living quarters, mess facilities, and medical support are crucial for maintaining troop morale, health, and operational efficiency. Insufficient infrastructure can lead to poor living conditions and suboptimal support for the physical and mental well-being of personnel, affecting their performance and overall morale.

37. By overcoming these logistic challenges, the Sri Lanka Armoured Corps can ensure that its tanks are properly maintained and troops are well motivated, leading to increased operational readiness, longevity, and overall combat effectiveness.

LIMITED RECRUITMENT

38. The Sri Lanka Armoured Corps is experiencing a decline in recruitment and a reduction in its overall strength due to several factors. These factors include the lack of social recognition for military service, better and more attractive employment opportunities in other sectors, negative experiences shared by veterans, limited job opportunities after retirement, and a lack of awareness and exposure to the Armoured Corps among potential recruits. In addition, the perception of limited career progression in the Armoured Corps may also deter young officers from joining.

39. One significant factor is the diminished social recognition of military service. In recent years, the prestige and recognition associated with military service in society have decreased.

This lower societal esteem for military service may discourage potential recruits from seeing the Armoured Corps as an appealing career choice.

40. Moreover, the availability of better and more attractive employment opportunities outside the military can influence the decision-making of potential recruits. The private sector and other industries may offer higher salaries, improved work-life balance, and more job security, enticing individuals away from a military career.

41. The experiences shared by veterans play a crucial role in inspiring the next generation to join the military. However, negative experiences or perceptions can deter potential recruits, influencing their decision to choose alternative career paths instead.

42. Furthermore, the limited job opportunities for those retiring from the Armoured Corps, particularly beyond driving trade, can decrease the appeal of a military career. If individuals perceive that there are limited options for post-retirement employment, it can discourage them from considering the Armoured Corps as a viable long-term career choice.

43. A lack of exposure and awareness of the Sri Lanka Armoured Corps among potential recruits can also impact recruitment numbers. Without a comprehensive understanding of the Corps and its equipment, individuals may be less inclined to pursue a career in Armoured Corps.

44. Additionally, the perception of limited career progression within the Armoured Corps, particularly in the command structure, can deter young officers from joining. This is primarily due to the scarcity of command appointments within the Armoured Corps. The allure of career progression and leadership opportunities plays a significant role in attracting young officers to choose their career path. However, the limited availability of command appointments within the Armoured Corps poses a hurdle in attracting these aspiring officers. If there are few vacancies and limited opportunities for growth and advancement, individuals may opt for regiments or units that offer more chances for career development.

45. To address these challenges, it is crucial to enhance the social recognition and perception of military service, improve post-retirement job prospects, and increase awareness and exposure of the Armoured Corps among potential recruits. Offering attractive career

progression opportunities within the Armoured Corps is also vital to attracting young officers. By addressing these factors, the Sri Lanka Armoured Corps can work towards enhancing recruitment and sustaining its strength for the future.

CONCEPTUAL COMPONENT

46. Under the conceptual component, there are three major challenges faced by the Sri Lanka Armoured Corps. These challenges include the inappropriate employment of Armour, difficulties in responding to non-traditional threats and employability of armour during peace and concerns regarding the lack of integrated operations. These challenges require careful analysis and strategic planning to ensure the effective utilization and adaptation of armoured capabilities in modern warfare environments.

INAPPROPRIATE EMPLOYMENT OF ARMOUR

47. The inappropriate employment of Armour, deviating from its classic role, poses significant challenges to the smooth functioning of the Sri Lanka Armoured Corps in the long run. The primary role of armour is to engage in armoured warfare during wartime and perform other relevant tasks during peacetime. However, it has become increasingly common to see Armoured Corps troops being employed in RFT role. This inappropriate deployment not only hampers the development and grooming of cavalry troops in their own trade but also leads to serious maintenance issues for tanks as they are diverted for infantry tasks.

48. The improper utilization of armoured troops in non-armoured roles prevents them from honing their essential skills specific to armoured warfare. These skills include manoeuvring and operating tanks, engaging targets, and employing armoured tactics that are essential for the success of armoured units in combat scenarios. By deploying armoured troops in roles where they do not have the opportunity to exercise these critical skills, their proficiency and readiness in conducting armoured operations are compromised.

49. Furthermore, the employment of the Armoured Corps in non-armoured tasks limits the opportunities for personnel to develop and excel in the command structure required for effective armoured warfare. The command and control structure within the Armoured Corps

plays a pivotal role in ensuring coordination, synchronization, and decisive execution of operations. However, when personnel are consistently deployed in non-armoured tasks, they are unable to gain the necessary experience and expertise in leading armoured units and executing armoured operations at various command levels.

50. Moreover, the diversion of troops for non-armoured tasks results in serious maintenance issues. Armoured vehicles require regular maintenance, servicing, and repairs to ensure their operational readiness. The improper employment of tanks crews in non-armoured roles often leads to neglect in maintenance, as resources and attention are focused on other tasks. This neglect can result in increased break downs, reduced reliability, and potentially even the inability to deploy armoured units when needed.

51. To overcome these challenges, it is imperative to prioritize and ensure the appropriate employment of armour in its classic role. This entails maintaining a clear distinction between armoured and non-armoured tasks, allowing Armoured Corps personnel to focus on their specific trade and training requirements. Additionally, dedicated resources and support must be allocated to maintain the armoured vehicles and equipment in optimal condition. By rectifying the inappropriate employment of armour, the Sri Lanka Armoured Corps can better preserve its capabilities and effectively fulfil its role in armoured warfare.

RESPONDING TO NON-TRADITIONAL THREATS AND EMPLOYABILITY OF ARMOUR DURING PEACE

52. Responding to non-traditional threats and ensuring the employability of armour during peace time has become a challenge for the Sri Lanka Armoured Corps. While armour has proven to be a decisive asset during times of war, its orientation and suitability for tasks associated with non-traditional threats and duties during peace time are limited. The Armoured Corps, although having made significant contributions and displayed gallantry during war, faces difficulties in utilizing tracked vehicles for non-classic duties.

53. The employability of tracked vehicles, such as tanks, becomes less feasible during non-traditional threats and peace time. These types of threats often require agile and versatile forces that can adapt to dynamic situations, engage in counter-insurgency operations, and respond to

asymmetrical warfare tactics. The heavy and less manoeuvrable nature of tracked vehicles might limit their effectiveness in such scenarios. Even diverse terrain conditions can pose challenges for the employability of both tracked and wheeled vehicles, further complicating the situation.

54. Additionally, the limited deployment of wheeled equipment belongs to 1SLAC, primarily concentrated in the Colombo area. Thus, track regiments deployed in other areas find its irrelevance in their classic role during non-traditional threats or peace time tasks. This lack of adaptability and relevance restricts the Armoured Corps' ability to effectively respond to the evolving operational environment, highlighting the need for re-evaluating the force structure. One possible solution could be the establishment of composite wheel and track squadrons or regiments, allowing for more flexibility and adaptability in various operational settings.

55. Furthermore, training programme within the Armoured Corps tend to prioritize major combat operations, possibly neglecting the development of capabilities and skills required to respond effectively to non-traditional threats. In order to address this challenge, it is crucial to allocate greater priority to training that encompasses the full spectrum of operational requirements, including those associated with non-traditional threats. This will enable the Armoured Corps to develop the necessary skills, expertise, and mind set to effectively respond to a wider range of operational challenges.

56. Addressing these challenges requires a re-evaluation of the force structure, the establishment of composite wheel and track units, and a greater emphasis on training programs that encompass a broader range of operational scenarios.

LACK OF INTEGRATED OPERATIONS

57. The lack of integrated operations is another significant challenge for the Sri Lanka Armoured Corps, directly linked to the previous topic of the employability of the Armoured Corps in the present operational environment. While the Armoured Corps has historically conducted combat operations alongside infantry and artillery units, the current training and infrastructure do not adequately facilitate a foundation for effective cooperation. However, the

contemporary operational environment demands better cooperation and integration among armour, infantry, and other assets of fire support and reconnaissance, including the air element.

58. The concept of integrated operations emphasizes the coordination and synchronization of different elements within a military force to achieve maximum combat effectiveness and operational success. In the case of the Armoured Corps, this involves seamless collaboration between armoured units, infantry, supporting arms, and other elements. This integrated approach allows for swift and effective combined arms operations, leveraging the strengths of each component to achieve operational objectives.

59. Nevertheless, the current training environment and infrastructure do not sufficiently address the concept of integrated operations. The lack of focus on joint training and exercises limits the opportunities for different units to train and operate together, hindering the development of effective cooperation and integration. This has direct implications for the usefulness and employability of the Armoured Corps in the entire spectrum of operations, including against non-traditional threats.

60. By actively addressing this challenge and emphasizing the importance of integrated operations, the Sri Lanka Armoured Corps can significantly enhance its relevance and effectiveness. This can be achieved through the development of joint training programme and exercises that involve multiple units and elements working together. By conducting realistic scenarios and exercises, the Armoured Corps can foster greater understanding, trust, and interoperability among different components, leading to improved operational effectiveness.

61. Additionally, investing in infrastructure that facilitates joint operations, such as communication networks and command and control systems, is crucial for enabling effective integration. These tools and systems enable efficient and timely exchange of information and coordination among different units, improving situational awareness and the ability to make informed decisions.

62. Thus, by prioritizing joint training, fostering cooperation and integration among different units, and investing in infrastructure, the Armoured Corps can enhance its relevance and effectiveness in the present operational environment. Integrated operations not only

improve combat effectiveness but also provide better employability, enabling the Armoured Corps to be an effective arm in a wide spectrum of operations, including non-traditional threats.

MORAL COMPONENT

63. Under the Moral Component, several challenges significantly impact the efficiency and effectiveness of the Sri Lanka Armoured Corps. These challenges include less career progression, leadership and command challenges, and cadre retention issues. Addressing these challenges is crucial to maintaining the morale, professionalism, and cohesion of the Armoured Corps, ensuring its ability to fulfil its responsibilities effectively. By recognizing and addressing the factors that affect the moral component, the Sri Lanka Armoured Corps can better cultivate a motivated and skilled workforce, promoting long-term success and readiness.

LESS CAREER PROGRESSION

64. The less career progression of both officers and Other Ranks within the Sri Lanka Armoured Corps has a significant negative impact on the moral component. In the officer corps, there is a notable dilemma in holding mandatory appointments due to the scarcity of command appointments. This results in a situation where many capable officers become ineligible for career progression as they exceed the age limit before being able to hold a Commanding Officer appointment. In contrast, officers from other arms have better career progression opportunities as they have an adequate number of regiments to command.

65. Furthermore, young officers face challenges when they are assigned to serve on ERE outside their regiments, as they do not have enough time to fulfil the mandatory appointments within the regiments. This limits their career advancement and hampers their professional development within the Armoured Corps.

66. Similarly, Other Ranks encounter career progression issues, often stemming from a lack of awareness regarding mandatory qualifications required for subsequent promotions. Certain trades within the Armoured Corps may have better career progression opportunities compared to other trades, leading to a sense of inequity and demotivation within the ranks. These disparities in career progression adversely impact the morale of those in less favourable trades.

67. These career progression issues have serious implications for the morale and motivation of both officers and Other Ranks. They create a sense of frustration and dissatisfaction among personnel within the Armoured Corps, as qualified and capable individuals are hindered from advancing in their careers simply due to a lack of available opportunities. This can result in a loss of talented individuals and negatively impact the overall efficiency and effectiveness of the Armoured Corps. By addressing these career progression concerns, the Armoured Corps can enhance morale, maintain a skilled workforce, and ultimately improve its operational readiness and effectiveness.

LEADERSHIP AND COMMAND CHALLENGES

68. The Sri Lanka Armoured Corps faces significant leadership and command challenges, stemming from various concerns within the organization. One such challenge is the lack of Mission Command, where commanders at every level are not given adequate authority and resources to take initiatives. As a result, even simple tasks require constant monitoring and approval from higher authorities. This hampers the authority and decision-making capabilities of lower commands and leads to complex and time-consuming procedures.

69. The zero-error fallacy is another issue within the Armoured Corps, where higher headquarters are less tolerant of even minor errors made by their subordinates. This discourages the taking of initiatives and innovations, as there is a fear of making any mistakes. Additionally, this approach hinders the delegation of powers to subordinates, as higher-ranking officers feel they are personally responsible for even the smallest aspects of their subordinates' actions. This can create an environment of micromanagement and undermines the development of responsible and independent subordinates.

70. Furthermore, Commanding Officers often find themselves assigned with tasks that have little or no direct link to their classic role. This not only disrupts the routine progression of the troops and their professional development but also leads to a waste of limited resources that have been allocated for military duties. This lack of focus on the core responsibilities of the Armoured Corps limits the effectiveness and efficiency of the organization.

71. Addressing these leadership and command challenges requires a shift towards a more decentralized and empowered command structure. Mission Command principles should be

embraced, allowing commanders at every level to exercise authority and initiative within clearly defined objectives. This will promote a culture of independent decision-making and innovation.

72. Additionally, a more realistic and balanced approach should be adopted regarding errors and mistakes. Instead of a zero-error fallacy, a culture of learning from mistakes and encouraging initiatives should be fostered. This will promote a sense of responsibility among subordinates and encourage them to take ownership of their actions.

73. Furthermore, efforts should be made to streamline the assignments and tasks given to Commanding Officers, ensuring they align with their core role and responsibilities. This will allow for better focus and utilization of resources, as well as the professional growth and development of the Armoured Corps troops.

74. By addressing these leadership and command challenges, the Sri Lanka Armoured Corps can create a more effective and efficient organization, where initiative, innovation, and accountability thrive at all levels of command.

CADRE RETENTION

75. Cadre retention is indeed a serious issue not only in the Sri Lanka Army but also in the Armoured Corps. Several factors contribute to this challenge, which also links to limited recruitment issue. The availability of better and more attractive job prospects outside the military often tempts potential and risk-taking individuals to leave the Armoured Corps. This loss of capable personnel negatively impacts the overall effectiveness and readiness of the Corps.

76. Additionally, officers and men seek better work-life balance, including quality family life, which can be challenging to achieve within the demanding military environment. The lack of professional growth opportunities, low job satisfaction, and a perceived lack of appreciation within the Corps are further reasons that personnel opt to leave the military before completing their mandatory service. Evidence of this issue can be seen in data on absenteeism at the Regimental Centre.

77. In the past, joining the military was seen as a prestigious and respected profession. However, the diminishing social recognition of the military as a whole has contributed to the high absent rate. Officers and enlisted personnel who possess the capability to take risks and initiatives may choose to leave the Armoured Corps in search of better opportunities and recognition.

78. To address the challenge of cadre retention, it is crucial to focus on selecting and retaining the best performers within the Corps. Identifying and nurturing talented individuals and providing them with opportunities for career progression can foster a competitive culture and encourage other personnel to strive for improvement. This can be achieved through initiatives such as training programme and recognition for outstanding performance.

79. Efforts should also be made to improve professional development opportunities within the Armoured Corps, ensuring that personnel feel valued, have opportunities for growth, and experience job satisfaction.

80. Furthermore, addressing work-life balance concerns and improving the quality of life for personnel can enhance cadre retention. Implementing policies that support family-friendly practices and offering support services can go a long way in attracting and retaining talented individuals.

81. In conclusion, cadre retention is a significant issue within the Sri Lanka Armoured Corps. Limited recruitment opportunities, better job prospects outside the military, work-life balance concerns, and a lack of professional growth and job satisfaction all contribute to high absent rates. By focusing on selecting and retaining the best performers, improving professional development opportunities, and addressing work-life balance concerns, the Armoured Corps can work towards retaining and attracting capable personnel, ultimately enhancing the effectiveness and readiness of the Corps.

CONCLUSION

82. In conclusion, this study has aimed to shed light on the challenges faced by the Sri Lanka Armoured Corps in the current operational environment, which is characterized by economic constraints. The challenges have been examined through the lens of the three

elements of fighting power: the Physical Component, Conceptual Component, and Moral Component. It is crucial for leaders at every level to devote serious attention to these challenges, in order to elevate the standards and ensure the Armoured Corps can sustain a successful and enduring journey.

83. While some of the remedies and solutions may require financial support, it is essential to recognize that many can be implemented through conceptual changes and careful planning. The focus should be on enhancing the physical readiness of the Corps by upgrading or procuring new equipment, providing training and skill development opportunities, addressing logistics challenges, and expanding recruitment efforts. Concurrently, attention must also be paid to the conceptual aspect, such as revisiting strategies, fostering a culture of innovation and flexibility, and improving leadership and command practices.

84. Moreover, tackling the challenges within the Moral Component is paramount. This entails addressing issues related to career progression, leadership and command, and cadre retention. By recognizing and addressing these concerns, the morale, professionalism, and cohesion of the Armoured Corps can be bolstered, allowing for long-term success and readiness.

85. It is important to recognize that the solutions to these challenges extend beyond financial considerations. While financial support is crucial, implementing conceptual changes and careful planning can also yield significant improvements. This requires a commitment from leadership at all levels, in conjunction with a drive for continuous improvement, innovation, and adaptability.

86. In conclusion, the Sri Lanka Armoured Corps must prioritize addressing the challenges within each element of fighting power, with a focus on both tangible and intangible aspects. By doing so, the Corps can overcome obstacles, enhance its operational capabilities, and ensure a strong and enduring future in service to the nation.

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OVERCOMING CHALLENGES: INNOVATIONS AND SUCCESSES OF MILITARY IN WORLD CONTEXT

3 ARMOURED REGIMENT

UNIT SYMPOSIUM 2024

OVERCOMING CHALLENGES: INNOVATIONS AND SUCCESSES IN MILITARY IN WORLD CONTEXT

by

Maj TM Basnayaka

ABSTRACT

This comprehensive report delves into critical aspects of military innovation and success on a global scale. Examining case studies from Israel's continuous innovation of the Merkava tank series to Germany's implementation of predictive maintenance technologies, the report sheds light on overcoming challenges faced by modern armored units. It explores the U.S. Army's recruitment difficulties and analyzes the enhancements in military capability through joint service operations. The overarching goal is to understand how nations navigate contemporary challenges, innovate, and secure victories in an ever-evolving global military landscape.

ABBREVIATIONS

IED	Improvised Explosive Devices
IDF	Israel Defense Forces
LAHAT	Laser Homing Attack
VR	Virtual Reality
JROTC	Junior Reserve Officers' Training Corps
USSOCOM	U.S. Special Operations Command
GFP	Global Firepower ranking

INTRODUCTION

1. In the realm of modern warfare, nations grapple with multifaceted challenges, necessitating continuous innovation in armored units and military strategies. This report embarks on a journey through key case studies, beginning with Israel's exemplary Merkava tank series that symbolizes the nation's commitment to technological advancements. Germany's predictive maintenance technologies offer insights into optimizing resource allocation and ensuring operational efficiency. The report then addresses the daunting task faced by the U.S. Army in recruiting its next generation, followed by an exploration of the enhancements achieved through joint service operations. Each facet contributes to the broader understanding of how nations navigate challenges and fortify their military capabilities.

OBJECTIVES OF THE STUDY

2. The objectives of the study are as follows:

a. To study Israel's commitment to technological advancements in its Merkava tank series and discusses the importance of equipment upgrades for armored tanks in overcoming challenges.

b. To get an idea of predictive maintenance technologies and Germany's approach to addressing tank maintenance challenges.

c. To study the challenges faced by the U.S. military in recruiting and the measures taken to address recruitment shortfalls.

d. Explore the significance of joint military operations and find the key improvements gained by the U.S. military through joint operations.

EQUIPMENT UPGRADES AND INNOVATION

3. Equipment upgrades and innovation are crucial for overcoming challenges related to armored tanks for several reasons:

a. **Adaptation to Evolving Threats**. Modern battlefields are dynamic and constantly evolving. Adversaries develop new tactics and deploy advanced weaponry.

Upgrading equipment ensures that armored tanks remain effective and adaptive to counter emerging threats, including advanced anti-tank systems and unconventional warfare tactics.

b. **Enhanced Survivability.** Advanced armor technologies, active protection systems, and improved fire control systems contribute to the overall survivability of armored tanks. Upgrades enable tanks to withstand a broader range of threats, including anti-tank missiles, IEDs, and kinetic energy penetrators.

c. **Improved Firepower.** Innovations in weapon systems, such as more powerful and accurate guns, advanced ammunition types, and enhanced targeting systems, contribute to improved firepower. This is essential for engaging a diverse range of targets, including armored vehicles, fortified positions, and enemy infantry.

d. **Technological Countermeasures**. Upgrades in electronic warfare, countermeasures, and active protection systems help armored tanks mitigate the impact of guided missiles, electronic jamming, and other electronic threats. This technology is crucial for maintaining operational effectiveness on the modern battlefield.

e. **Operational Flexibility.** Innovation allows for the integration of new technologies that enhance the operational flexibility of armored units. This includes modular armor systems, adaptive suspension, and unmanned systems, enabling tanks to perform effectively across different terrains and operational scenarios.

f. **Network-Centric Warfare.** Integration of advanced communication and information systems facilitates network-centric warfare, enabling better coordination and communication between armored units and other elements of the military. This interconnectedness improves situational awareness and overall operational efficiency.

g. **Extended Service Life.** Upgrading equipment extends the service life of armored tanks, making it cost-effective compared to procuring entirely new fleets. This is particularly important for nations with budget constraints, allowing them to maintain a capable armored force without the financial burden of widespread replacements.

h. **Addressing Technological Gaps**. Many older tank models may lack the technological advancements of newer counterparts. Upgrading existing tanks helps bridge technological gaps, ensuring that even older platforms can benefit from contemporary technologies and remain relevant in modern conflicts.

i. **Training and Human Factor**. Innovation in equipment often involves improvements in user interfaces, automation, and training simulators. This makes it easier for crews to operate and maintain the equipment effectively, addressing human factors and ensuring that operators are well-prepared for complex operational environments.

ISRAEL'S SUCCESS IN CONTINUOUS INNOVATION OF ITS MERKAVA TANK SERIES

4. Israel's success in armored warfare is exemplified by the continuous innovation of its Merkava tank series. The Merkava V (Merkava Barak), the latest iteration, stands as a testament to the country's commitment to technological advancements and crew survivability.

Figure 2 : Merkava Barak tanks.[1]

[1] The Israel Defence Forces (IDF) Official Website.

5. In the past forty years, just a handful of countries have proved themselves capable of building their main battle tanks. One of these tank powers is one of the smallest countries in the world: Israel. Israel's main battle tank, the Merkava series, is one of the best-designed tanks ever produced. Israel's independence in 1948 saw the formation of the Israeli Defense Forces, and the IDF cobbled together a modest, ramshackle tank force to repel attacks from neighboring Arab countries. By the 1956 war the situation had improved considerably, and by 1967 Israel's Armored Corps won the Six-Day War with a blitz across the Sinai Peninsula and into the Golan Heights. The tanks, American M48 and British Centurion tanks crushed the opposition and brought a quick end to the war.

6. Israel's pre-emptive attack on its neighbors was not popular with some of its European allies. Hence, Israel decreased its reliance on foreign powers for its armaments, and in 1970 the IDF began to develop a tank of its own. Three attributes define a modern tank: firepower (the main gun), mobility (speed and cross-country operation), and protection (armour). Some tank-building countries emphasize one or two attributes over the other. In Israel's case, they prioritized protection over all else.

7. The Israeli tank's emphasis on protection manifested itself in several ways. The tank featured thick-spaced armor of a local design, and the hull and turret were designed with sharp angles meant to increase armor thickness through sloping. This gave the tank a sleek, futuristic look. Breaking with tank convention, the engine and transmission were located in the front of the tank, giving the crew extra protection if an antitank round penetrated the frontal armor. Hydraulic turret control, which used a flammable fluid that burned many Israeli tankers in the 1973 war, was replaced with an electric control system, and ammunition was stored in fireproof canisters until use to minimize the likelihood of an ammunition explosion.

8. The tank's main gun was the 105-millimeter M68 main gun, the same gun that appeared on the IDF's Centurion, Patton, and M60 tanks. The tank carried sixty-two rounds for the main gun, slightly above average, to ensure the tank could fight through ammunition supply shortages. The tank had three machine guns, including one coaxial 7.62-millimeter machine gun paired with the main gun and additional 12.7- and 7.62-millimeter machine guns up top for the commander and loader. These were useful for engaging enemy infantry, soft-skinned vehicles, and antitank-missile teams, such as the AT-3 Sagger crews that took a heavy toll in

the 1973 Yom Kippur War. A burst of machine-gun fire over the heads of a missile operator could throw a command-operated antitank missile off course, saving a tank and its crew.

9. Mobility was the lowest of the three priorities for the Israeli tank, and the tank used just a nine-hundred-horsepower diesel engine. The new tank, known as Merkava ("Chariot") was unveiled in May 1979. The tank was unlike anything fielded by other armies, particularly the United States and the Soviet Union. The Merkava first saw action in 1982, when it fought Soviet-made Syrian T-72 tanks in the Bekaa Valley. Merkavas destroyed several eight T-72s at ranges of up to 4000 m, without loss to a single T-72.

PROGRESSIVELY IMPROVEMENT OF MERKAVA

10. Israel's frequent wars have resulted in a consistent flow of combat experience, resulting in new and progressively improved Merkava tanks. The current tank, Merkava V, retains the Merkava I's design priorities and incorporates digital warfare capabilities, new redesigned turret, explosive reactive armor, and modular passive armor for quicker battle-damage repair. It mounts a larger 120 mm smooth-bore main gun with fifty-eight rounds, including the LAHAT antitank guided missile, eighteen more rounds than the M1A2 Abrams with a similar gun. It has a larger 1,500-horsepower engine, bringing the horsepower-to-weight ratio up to 23.8 to one, and the tank is correspondingly faster.

11. The Merkava is protected by the Trophy active-protection system, which uses a combination of turret-mounted sensors and explosively formed projectiles to shoot down enemy tank gun rounds, rockets, and antitank guided missiles. The trophy is combat proven, having saved several Merkava IV tanks (and their crews) from antitank weapons fielded by Hamas in 2014's Operation Protective Edge in the Gaza Strip. Another features of the Barak tank is the high-tech helmet, dubbed IronVision. Similar to a fighter jet pilot's helmet, IronVision provides the tank commander with a 360-degree view of the battlefield and displays relevant information in real time. The helmet employs artificial intelligence capabilities to assist in target identification and engagement.

12. An iconoclastic tank in the world of heavy armor, Merkava is also a proven combat winner. While not the tank for every army, it is the perfect main battle tank for the Israeli Defense Forces. As important as tanks are to Israel's security, the country has already started

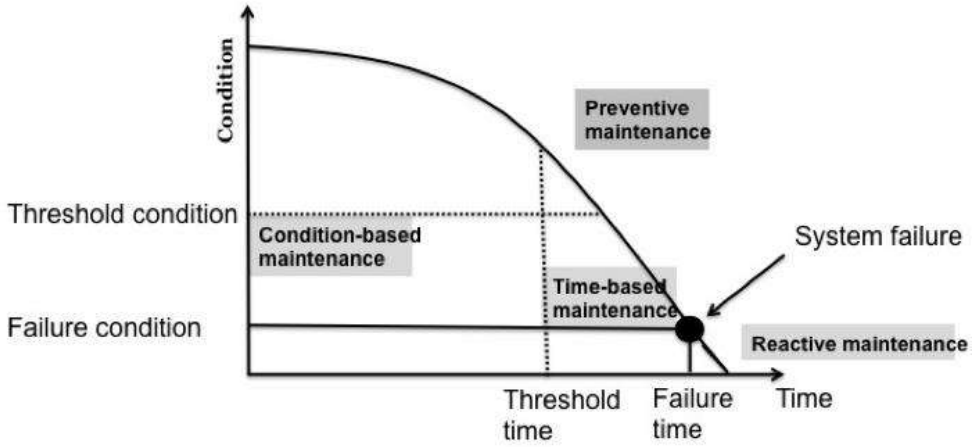
development of a successor to the Merkava V well before it reaches obsolescence. As Israel's enemies already know, the Merkava will be a tough tank to beat.

GERMANY - PREDICTIVE MAINTENANCE TECHNOLOGIES

13. Another critical challenge faced by armored units is the inadequacy of tank maintenance materials, which can hinder the operational readiness of military fleets. In response to this challenge, Germany has implemented innovative solutions, particularly in the realm of predictive maintenance technologies, to optimize resource allocation and enhance the overall efficiency of tank maintenance.

MAINTENANCE: REACTIVE, PREVENTIVE, AND PREDICTIVE

14. A new device fresh from the manufacturer is healthy and problem-free. Due to wear and tear on the device as it ages, its health slowly deteriorates and eventually, it fails. At this point, it is required to perform maintenance for the device to get it back to a healthy condition.



Graph 1 : Maintenance: Reactive and Preventive

15. Based on the above simple graph, there are three main types of maintenance: Reactive, preventive, and predictive. With reactive maintenance, simply wait until a device breaks down and then perform maintenance on that device. That means, waiting until the device fails and then conducting maintenance (react), hence reactive maintenance. Reactive maintenance may work fine for household equipment but it is probably not the best choice for industrial processes.

16. In preventive maintenance, conduct maintenance for the device long before the device gets to the point of failure. However, this is not very cost-effective. Because performing the maintenance early and hence, wastes device life that is still usable. Therefore, the solution for that is predictive maintenance.

17. With predictive maintenance, predict when the device fails and schedule maintenance just before that. Hence, minimize the device or machine downtime and maximize its lifetime, also be little to no wasted device lifetime. This is simply done using the previous data that was collected from a similar device in the past and by analyzing the available data from the current devices, it is easy to accurately predict when a similar device fails.

18. The German Army incorporates advanced diagnostics, prognostics, and data-driven solutions to optimize the maintenance process for its armored vehicles, including tanks. They utilized these technologies as follows:

a. **Condition Monitoring**. Germany employs condition monitoring systems that continuously collect data from various sensors embedded in armored vehicles. These sensors monitor crucial components such as engines, transmissions, and other mechanical systems.

b. **Predictive Analytics**. Utilizing sophisticated predictive analytics, the German Army analyzes the data collected from condition monitoring systems. Algorithms assess the condition of different vehicle components and predict when maintenance is likely to be required based on usage patterns, wear and tear, and historical performance data.

c. **Proactive Maintenance Planning**. Predictive maintenance allows the German military to plan maintenance activities proactively rather than reactively. By anticipating when specific components are likely to fail or require attention, the military can schedule maintenance during planned downtime, minimizing disruptions to operational capabilities.

d. **Resource Optimization.** Germany's approach to predictive maintenance is resource-centric. It optimizes the allocation of maintenance resources, ensuring that the

right materials and spare parts are available when and where they are needed. This prevents unnecessary stockpiling of materials and streamlines logistics.

e. **Reduced Unplanned Downtime**. By addressing maintenance needs before they lead to critical failures, Germany reduces unplanned downtime for its armored fleet. This is crucial for maintaining high operational availability, especially during training exercises, peacetime activities, and operational deployments.

f. **Integration of Digital Twins**. Germany explores the use of digital twin technology, creating virtual replicas of armored vehicles. This allows for in-depth analysis and simulation of vehicle behavior under different conditions, aiding in identifying potential issues and planning maintenance interventions.

g. **Continuous Improvement**. The use of predictive maintenance technologies enables continuous improvement of maintenance strategies. As the German Army collects more data and refines its algorithms, the effectiveness of predictive maintenance increases, contributing to a more reliable and efficient armored force.

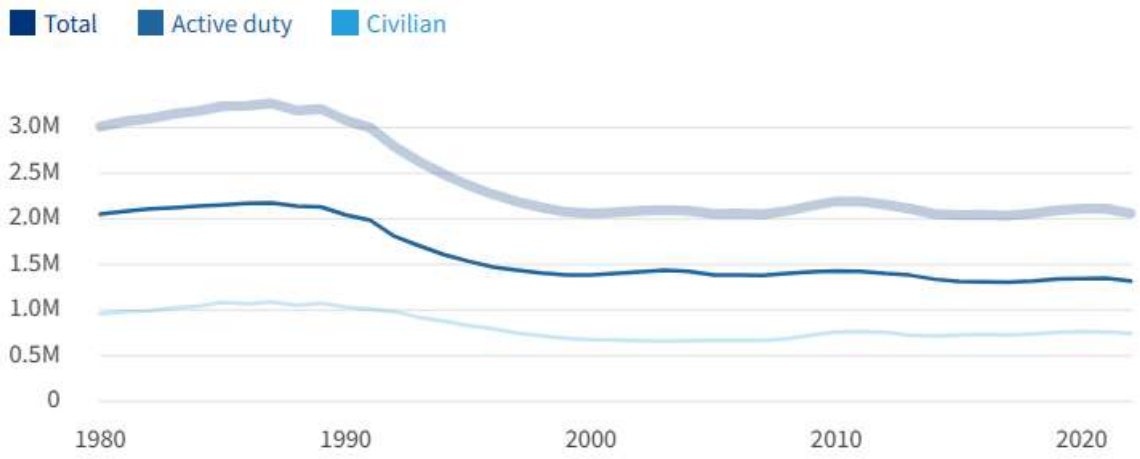
19. In summary, Germany's approach to overcoming the inadequacy of tank maintenance materials is characterized by the adoption of predictive maintenance technologies. By harnessing the power of data analytics and condition monitoring, Germany optimizes maintenance processes, reduces downtime, and ensures that armored vehicles remain in peak operational condition. This strategy aligns with the broader trend in the defense industry toward smart maintenance practices, enhancing the overall readiness and effectiveness of armored units.

THE DIFFICULTY OF RECRUITING THE U.S. ARMY'S NEXT GENERATION

20. The United States Armed Forces are the military forces of the United States. The armed forces consist of six service branches: the Army, Marine Corps, Navy, Air Force, Space Force, and Coast Guard. The U.S. Armed Forces are the most powerful military in terms of budget, capabilities, and dominance across land, sea, air and space. The U.S. spends more than any other country on defense, accounting for over one third of the world's defense expenditures. In

2020, the U.S. military budget was $778 billion. Apart from that for 2023, the U.S. is ranked 1 of 145 countries in Annual GFP review.

21. But the United States military is facing its worst recruitment numbers since the end of the Vietnam war and it's causing a major national security problem for the U.S. military. There were 1.3 million active-duty military in 2022, 39% fewer than in 1987, its recent peak.



Graph 2 : The U.S. Active-duty Military Strength[2]

22. As per the U.S. Army leaders projected last year that active Army troop strength for 2023 would have a shortfall of almost 20,000 from the projected 485,000, it quickly led to action inside the force and heated debate outside. Army Secretary Christine Wormuth and Chief of Staff General James McConville announced they would shift up to $1.2 billion from Army programs to recruiting initiatives, enlistment and reenlistment bonuses, and other efforts.

23. It is important to maintain their active military cadre due to the ambitious U.S. foreign policy goals of defending its borders, upholding international order as well as promoting American interests abroad. U.S. current strategy is based around being a superpower in Europe, the middle east and asia pacific. Hence, the U.S. has sized its military to be able to fight more than one conflict at a time in those regions.

[2] The U.S. Defense Manpower Data Center.

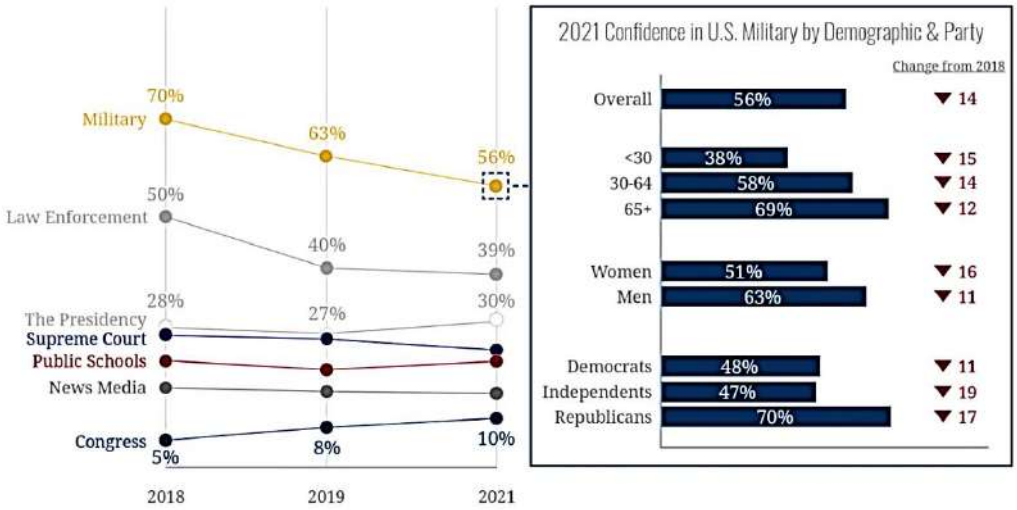
24. The problem isn't unique to the United States. Canada and the UK are also significantly missing their fourth strength numbers. Canada is 7600 members short and the UK is likely to shrink down to 72000 soldiers by 2025. Some UK infantry regiments are reported to be understaffed by 30%. But, other nato allies like Turkey rely on mandatory service to fix this problem with 32% of their ranks being onscripts. something that U.S. politicians and military leaders strongly oppose.

25. As per the analysis, it has been identified four major reasons for United States military is facing its worst recruitment challenges;

a. Declining trust in the U.S. military.
b. Tight labor market.
c. Woke military culture.
d. Unqualified citizens.

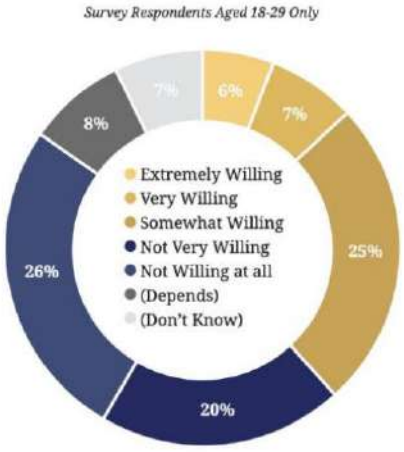
DECLINING TRUST IN THE U.S. MILITARY

26. The 2021 Ronald Reagan Institute National Defense Survey found there was a serious decline in trust and confidence in the military. Public trust in the military was at 70% in 2018, down to 63% in 2019, and 56% in 2021 with the greatest loss of confidence in those under 30 years of age (where recruits come from).



Graph 3 : Trust and Confidence in U.S. Institutions [3]

27. In 2020, more than 62,000 National Guard troops were deployed to control violence in the wake of the George Floyd riots. This is one of the major and recent example of declining public trust and confidence in the military.



Graph 4 : Propensity to Join U.S. Military.[4]

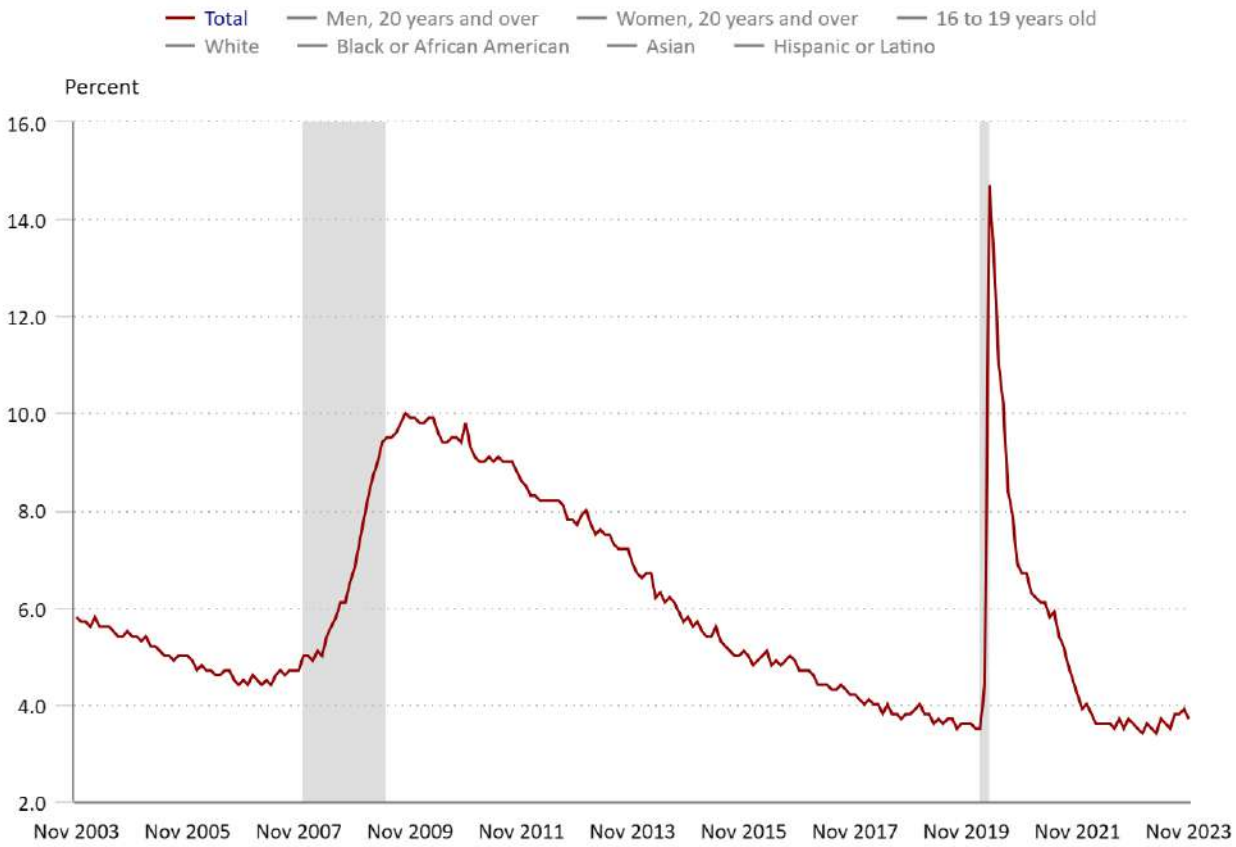
28. As part of the Pentagon's $1.6 billion recruiting effort each year, the army released a new advertising campaign called the 'calling' in 2021. But just a week after the series was launched, the Army said it had to disable comments on the videos on May 12 after seeing "a significant uptick in negative commentary which were not aligned with Army values." Apart

[3] Ronald Reagan Institute. The 2021 National Defense Survey.
[4] Ronald Reagan Institute. The 2022 National Defense Survey.

from that advertisement became the subject of mockery on Twitter too. The issue of these were that, ads ran in opposition to the main military message of unity, teamwork, and selfless service.

TIGHT LABOR MARKET

29. The U.S. unemployment rate is at 3.7% (As per Nov 2023) around the lowest it's been in the better part of a decade, meaning recruiters have a smaller pool of recruits to draw from. Currently the U.S. job market is doing well and this makes the Army's benefits look less attractive for the youth. Also, there is a lack of awareness; most of them do not really know how time in the Army is spent or what the other benefits are.



Graph 5 : The U.S. Civilian Unemployment Rate[5]

WOKE MILITARY CULTURE

30. Woke is U.S. slang term that means "aware of and actively attentive to important facts and issues (especially issues of racial and social justice)." As per the analysis, it was found that

[5] The U.S. Bureau of Labour Statistics.

the tendency of U.S. military leadership shifted their focus from winning wars to a focus on feelings and soldiers squealing at other soldiers for minor speech pronoun infractions. Because, Secretary of Defense Lloyd Austin also claims that he wants to stamp out the massive toxic masculinity and prejudice in the military. That's why he mandated a one-day stand-down to discuss "white privilege" and racial discrimination that has been ingrained in their military since its founding.

31. It is true that many in our culture want young men to become kinder gentler, and more feminine but that doesn't work for the military, Most 18 to 20 year old men would be more likely to sign up if the Army placed greater emphasis on training and equipping troops to overcome the nation's enemies rather than teaching them to embrace their preferred pronouns and transgenderism

UNQUALIFIED CITIZENS

32. According to the latest public data from the U.S. Army Recruiting Command, it was revealed that 77% of Americans between the ages of 17 and 24 would be ineligible for military service because of obesity, drugs, physical and mental health problems, misconduct, and aptitude.[6] In 2018, a report from Mission: Readiness - a bipartisan organization of 750 retired generals and admirals, declared America's youth "unhealthy and unprepared" for the challenges of military service.

33. To cater to this issue, the U.S. is promoting JROTC programs in schools, currently only 10% of schools have these kinds of programs. This helps messaging targeted to reach the country's youth explaining why they need skills to protect against the threats of enemies around the world.

34. To address these gaps, the US has gradually lowered the entry standards for joining the military, for example, a recent decision by the US Air Force is to relax rules on hand and neck tattoos also on past marijuana use you will not be disqualified for the entry. Apart from that

[6] Thomas Novelly. 'Even More Young Americans Are Unfit to Serve, a New Study Finds. Here's Why'. Military.com.

they have expanded the eligibility criteria to include non-citizens. For several years, legal immigrants have been permitted to serve in the US military as a means to expedite their path to US citizenship. In recent times, there have been suggestions to recruit undocumented immigrants.

U.S. MILITARY CAPABILITY ENHANCEMENT THROUGH JOINT SERVICE OPERATION

35. Joint operations have become increasingly common in contemporary military operations as they involve multiple branches of the military and sometimes even multinational forces. These operations are often complex and require meticulous planning coordination and execution. As such they present a unique set of challenges that require a comprehensive understanding of the various factors that can impact the success of the operation.

36. The United States is often recognized as a leading country in terms of engaging in joint military operations due to its global military presence and involvement in various international conflicts and peacekeeping missions. Their operations diversify with broad categories;

a. **Coalition Operations**. The United States frequently engages in coalition operations, where it collaborates with allies and partners to address shared security challenges. Notable examples include coalitions formed during the Gulf War (1990-1991), the war in Afghanistan, and the Iraq War (2003-2011).

b. **NATO Operations**. The U.S. is a key member of the North Atlantic Treaty Organization (NATO), a military alliance that conducts joint operations to address collective defense and security concerns. NATO has been involved in operations such as the Kosovo War and counter-piracy missions.

c. **Multinational Peacekeeping**. The U.S. participates in multinational peacekeeping missions under the umbrella of the United Nations (UN). These operations involve joint efforts with military forces from various countries to maintain peace and stability in conflict zones.

d. **Counterterrorism Operations**. The U.S. is actively involved in joint counterterrorism operations globally. This includes collaboration with allies and partners to combat transnational terrorist threats, such as those posed by Al-Qaeda and the Islamic State.

e. **Humanitarian Assistance and Disaster Relief**. The U.S. military often participates in joint operations focused on humanitarian assistance and disaster relief. These efforts involve coordination with international organizations, non-governmental organizations (NGOs), and other nations to provide aid and support in times of crisis.

f. **Training and Exercises**. The U.S. conducts joint military training exercises with numerous countries to enhance interoperability and strengthen military capabilities. These exercises involve the integration of forces from different services and partner nations.

37. The U.S. military has made several improvements as a result of engaging in joint operations, which involve the coordinated efforts of multiple branches of the military (Army, Navy, Air Force, Marines, and Space Force) as well as collaboration with allied and partner nations. These joint operations contribute to the overall effectiveness, adaptability, and interoperability of U.S. military forces. Here are key improvements resulting from joint operations:

a. **Interoperability**. Joint operations enhance the interoperability of different military branches and allied forces. Standardized procedures, communication protocols, and joint training exercises ensure that diverse military units can work together seamlessly, contributing to a more effective and cohesive force.

b. **Combined Arms Operations**. Joint operations allow for the integration of various military capabilities, including infantry, artillery, air support, naval assets, and cyber capabilities. This integration enables the U.S. military to conduct complex and multifaceted operations that leverage the strengths of each service branch.

c. **Strategic Flexibility**. Engaging in joint operations enhances the strategic flexibility of the U.S. military. The ability to deploy and employ forces across different

domains (land, air, sea, space, and cyberspace) provides decision-makers with a range of options to address diverse and dynamic security challenges.

d. **Adaptive Command and Control**. Joint operations require robust command and control structures that can adapt to rapidly changing situations. The U.S. military has improved its command and control capabilities to efficiently manage joint forces, ensuring rapid decision-making and effective execution of operations.

e. **Special Operations Integration**. Joint operations often involve collaboration with the U.S. Special Operations Command (USSOCOM). The integration of special operations forces, such as Navy SEALs, Army Rangers, and Special Forces, enhances the U.S. military's ability to conduct unconventional warfare, counterterrorism, and other specialized missions.

f. **Enhanced Intelligence Sharing**. Joint operations necessitate the sharing of intelligence and information across military branches and coalition partners. Improved intelligence-sharing capabilities enhance situational awareness and support more informed decision-making during operations.

g. **Improved Logistics and Sustainment**. Joint logistics and sustainment efforts ensure that military forces are adequately supported during joint operations. This includes the efficient movement of personnel, equipment, and supplies, contributing to the overall sustainability of military campaigns.

h. **Global Coalition Building**. Joint operations often involve building and leading coalitions of allied and partner nations. The U.S. military's experience in forming and maintaining international coalitions strengthens diplomatic ties, fosters burden-sharing, and enhances collective security efforts.

i. **Technology Integration**. Joint operations drive the integration of cutting-edge technologies across military branches. The U.S. military leverages advanced technologies in areas such as communications, surveillance, unmanned systems, and cyber capabilities to gain a technological advantage on the battlefield.

j. **Training and Professional Development**. Joint operations necessitate joint training and professional development for military personnel. This fosters a culture of collaboration, mutual understanding, and shared expertise, contributing to the overall professionalism of the U.S. military.

38. These improvements collectively position the U.S. military to address a wide range of contemporary security challenges, from conventional conflicts to irregular warfare and hybrid threats. The lessons learned from joint operations continually inform the evolution of military doctrine, tactics, and strategies to ensure the U.S. military remains adaptive and effective in a rapidly changing global security landscape.

CONCLUSION

39. In conclusion, this report provides a panoramic view of the global military landscape, emphasizing innovative approaches and successful strategies employed by nations to overcome contemporary challenges. Israel's Merkava tank series exemplifies the fusion of protection, firepower, and adaptability, setting a standard for armored warfare. Germany's embrace of predictive maintenance technologies reflects a commitment to efficiency and resource optimization. The U.S. Army's recruitment challenges underscore the evolving dynamics of trust, cultural shifts, and eligibility criteria. Joint service operations emerge as a cornerstone for the U.S. military, fostering interoperability, adaptability, and strategic flexibility. As nations navigate these complexities, the collective pursuit of innovation stands as a beacon, ensuring readiness and success in the face of an ever-changing global security landscape.

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INNOVATION AND GROWTH OF ARMOUR

3 ARMOURED REGIMENT

UNIT SYMPOSIUM 2024

INNOVATION AND GROWTH OF ARMOUR

by

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ABSTRACT

1. This paper introduced four concepts for civilian and military leaders to pursue innovation. The Military Innovation Framework is a tool to describe the different kinds of innovation: incremental, modular, radical, and architectural (or doctrinal). It is important to know which kind of innovation is desired to calibrate the organization for the appropriate mindset that will be required. Military innovation defined as a specific military, innovation is manifested by the development of new war fighting concepts and or new means of integrating innovation. New means of integrating innovation might include revised doctrine, tactics, training or support to ensure the growth of a particular force. Therefore, Innovation and growth is an important aspect for armour to achieve professionalism through the revise of doctrine, tactics, training, support. Inadequate innovations often effect on growth and existences. However, this study mainly focused to prioritizing of innovations to beef up the armour operational readiness effectively in order to maintain the fighting power of Sri Lanka Armoured Corps (SLAC) through the innovation and growth. Therefore, to create professionalized soldier, SLAC has to incorporate innovation and growth to enhance their skills, capacities, morale, and confidence.

Keywords: Innovation, Growth, Prioritization

LIST OF ABBREVIATIONS

APU	Auxiliary Power Unit
APC	Armoured Personnel Carrier
CDRD	Centre for Defence Research and Development
ERA	Explosive Reactive Armour
FMBT	Future Main Battle Tank
HP	Horse Power
IDRW	Indian Defence Research Wing
TI	Thermal Image
RPM	Revolutions Per Minute
SLAC	Sri Lanka Armoured Corps

INTRODUCTION

2. Changes in the geopolitical environment and the rapid pace of technological advances have pushed the topic of military innovation to the top of political and military debates. However, the current debate about military innovation seems to be plagued by a reliance on intuitive definitions. Perhaps more significantly, while various forms of the word innovate are used, basically, innovations seem to be focused on trying to identify the best way for the military to increase its capabilities, to be able to carry out more types of missions more effectively and at a lower cost. Military innovation, as an approach to increasing capabilities, is a complicated subject. There are several questions concerning the very nature of military innovation, the forces that influence military innovations, the best way to accomplish military innovation, and the inherently risky nature of military innovation in times of strategic (or geopolitical) uncertainty.

3. However, in South Asia including India, Pakistan and Bangladesh despite their operational commitments, they have given significance effort to develop their military element over the other elements of national power. Innovations in military architecture made prominence to accept any challengers as versatile force to overcome the contemporary situations. In this context Sri Lanka Army also required to accelerate its innovation and growth process in order up lift the fighting power of armour. However, this innovation process required to be logical approach to optimizing resources allocation for sustainable advancements. Additionally, a systematic approach enables the integration of emerging technologies, advance materials, equipment's and connectivity to enhance the capabilities of armoured units, ensuring they remain adaptive, resilient and formidable against the evolving threats while ensuring the its fighting power in optimal level throughout.

SCOPE OF THE STUDY

4. This study is focuses on identifying of suitable innovations that makes feasible options to get rid away on existing issues. Innovations are important aspect to achieve the growth and professionalism. Inadequate innovations often effect on growth and existences. Therefore, this study focusses on enhance the capability of physical component sequentially that positively effect on conceptual and moral component of fighting power of armour.

OBJECTIVES OF THE STUDY

5. To conduct this study in a significant manner following objectives are formulated:

a. **General Objective**. To identify the innovation and growth that could implies to armour.

b. **Specific Objectives**. As follows:

(1) Explore the significance and necessity of innovation and growth of armour.

(2) Apprise the existing and projected innovations of armour.

(3) Appreciate potential innovation and growth implies to armour.

SIGNIFICANCE OF THE STUDY

6. There is a compulsory requirement for innovation in armour, due effect of both internal and external environment. Within the Corps, the requirement is to maintain operational readiness effectively. Externally, there is a significant need to address non-traditional threats. Additionally, in order to remain a resilient force during peacetime, it is essential to upgrade and modernize existing inventory in the armor. Even though, the use of track vehicles is limited during peacetime operations, to maintaining fighting power of the armour conducting innovations in relation to tank fleet is essential for the force preparation. However, the deployment of wheeled APCs during peacetime becomes necessary when the need arises, especially for peace time operations and support to civil authorities during national disasters or emergencies. Therefore, this study primarily focuses on prioritizing innovations to enhance the armour's operational readiness effectively, thereby maintaining the fighting power of the Sri Lanka Armoured Corps (SLAC) through innovation and growth. Moreover, as SLAC performs its roles and tasks during peacetime, the significant requirement to assist government authorities in various circumstances becomes evident. Therefore, in order to develop as a professionalized organization, SLAC must embrace innovation and growth to enhance skills, capacities, morale, and confidence of its soldiers. This study serves to emphasize the importance of innovation and growth in achieving these goals.

INNOVATION: WHAT DOES IT MEAN AND WHAT ARE WE REALLY TALKING ABOUT?

7. Military innovation, basically is not about introducing something new simply because it is new, it is about finding and developing the new ideas that will allow the military to carry out its mission more effectively. Therefore, to invoke the subject in proper, it is required to define the military innovation initially. As per Isaacson.J.A, Layne C and Arquilla.J (1999) Military innovation as ‘For a specific military, innovation is manifested by the development of new war fighting concepts and or new means of integrating technology. New means of integrating technology might include revised doctrine, tactics, training or support’’. However, it is important to recognize military innovation and technological innovation are not synonymous. In fact, military innovation may encompass the use of high technology, but it may not require high technology. Many states simply cannot afford to invest in either acquiring or mastering the use of leading-edge systems. Such states, however, can be very successful military innovators. By coupling low-technology expedients with creative operational or tactical concepts, such states can attain a high degree of military effectiveness. Indeed, such states may be able to prevail against military opponents employing superior technology.

8. According to American Heritage Dictionary of the English Language, innovate means "to begin or introduce (something new) for or as if for the first time". As per Houghton (1996), Innovation refers to either the "act of introducing something new" or "something newly introduced". Note that these definitions are simple and free of association with any other concepts. According to Rosen (1991), believes that "changes in the formal doctrine of a military organization that leave the essential workings of that organization unaltered do not count as an innovation".

MILITARY EFFECTIVENESS DETERMINES INNOVATIVE SUCCESS

9. New war fighting concepts and or new means of integrating technology do not guarantee victory. This is because factors that are exogenous to military innovation play predominant role in determining battlefield outcome. Further, military effectiveness is more useful measure of innovative success and effective military determines the maximum combat power from available resources. Moreover, intrinsic political, strategic, operational and tactical

considerations affect a state's ability to generate military power. Moreover, Military effectiveness determines innovative success of a military suggests a direct connection between a military's operational capabilities and its ability to innovate. Following points elaborated on military effectiveness and innovation:

a. **Technological Advancements**. A militarily effective force often invests in research and development to stay technologically advanced. This commitment to cutting-edge technology can lead to innovations that enhance military capabilities, including improved weaponry, communication systems, and strategic planning tools.

b. **Adaptability and Flexibility**. A militarily effective organization is typically more adaptable and flexible in response to changing threats and environments. This adaptability fosters an environment where new ideas and innovative strategies are valued and implemented quickly.

c. **Training and Skill Development**. Highly effective military forces prioritize training and skill development. This commitment to continuous improvement can translate into a culture that values learning and the application of new techniques, technologies, and tactics.

d. **Operational Efficiency**. Innovation often arises from a desire to improve operational efficiency. Militaries that focus on streamlining their processes, logistics, and decision-making structures are more likely to generate innovative solutions to complex challenges.

e. **Strategic Thinking**. The nature of military operations requires strategic thinking and problem-solving. Military effectiveness involves anticipating and countering various threats, fostering a mindset that can contribute to creative problem-solving and strategic innovation.

f. **Collaboration and Teamwork**. Effective military operations rely on collaboration and teamwork. This emphasis on working together to achieve common goals can stimulate a culture of cooperation and idea-sharing, fostering an environment conducive to innovation.

10. While military effectiveness can drive innovation within a military context, it's important to note that innovation doesn't occur in isolation. External factors such as technological advancements in the civilian sector, geopolitical changes, and societal developments also play a significant role in shaping military innovation. Additionally, ethical considerations should guide military innovation to ensure responsible and lawful use of emerging technologies.

REQUIREMENT OF MILITARY INNOVATIONS

11. According to Waltz (1979), military innovation is determined by the external security environment, which influences whether a particular nation will have a strong incentive to pursue military innovation. States must ensure their own security through either external balancing, which involves acquiring allies, or internal balancing, which entails enhancing their own military forces qualitatively or quantitatively. However, referring to structural realist theory. First fear is a powerful incentive for a state to innovate is states that believe they are secure have a strong incentive to innovate and states that believe they are secure have little incentive. Second, states with revisionist political aim (general grievences, irredentist ambitions) have strong incentives to innovate. Because they are willing to use force alter the geopolitical status quo, such states have every reason to ensure their militaries are ready to go. Third, states with expanding international interests and ambitions (especially rising powers) have strong incentives to innovate the outward projection of their power increases the risk of conflict with others, and their newly acquired stakes and interests must be defended. Fourth, insecure states that lacks allies have strong incentives to innovate because it is imperative that their militaries be as effective as possible.

12. Finally, the competitive nature of international politics impels states to emulate the military capabilities and innovations of their rivals. But this not implies that do not necessarily copy them. There are number of reasons why states made their own military innovations due to effects of institutional change, the effects of the state/society continuum and cross societal effects. However, states do emulate and adapt the military innovations of others, but tailor them to fit their own geopolitical context, social structure and available resources. In the absence of sufficient resources, however, emulation may be impossible and new innovations may be

required. Thus, relative resource constraints provide yet another structural realist indicator of incentives to innovate.

CONCEPT OF INNOVATION

13. In developing countries, military innovation in Armoured Corps involves the adoption and integration of advanced technologies and strategic approaches to enhance the capabilities of armoured forces. This can be including the development and acquisition of modern armoured vehicles, upgrades to existing fleets and the implementation of innovative tactics and doctrines. The goal is to improve mobility, firepower, and protection thereby strengthening the overall effectiveness of the Armoured Corps in addressing contemporary security challenges. Additionally, developing countries may seek collaborations with established military partners or invest in research and development to create indigenous solutions tailored to their specific needs.

MILITARY INNOVATION FRAMEWORK

14. In his epic On War, Carl von Clausewitz established, “the first, the supreme, the most far-reaching act of judgment that the statesman and commander have to make is to establish…the kind of war on which they are embarking.” The same is true for innovation in the military. A leader, military or civilian of an organization that intends to innovate should first ask, what kind of innovation is desired?

15. Military innovations framework involves systematic approaches to identifying, developing and integrating new technologies, tactics, and strategies within a military context. While specific frameworks can very, a comprehensive approach often includes, technology assessment, research and development, adaptive doctrine, cross-domain integration, experimentation and prototyping, acquisition reform, training and education, and collaboration and partnerships. Further, a successful military innovations framework requires a balance between maintaining current capabilities and embracing new technologies to stay ahead of evolving security landscapes. It should adoptable, collaborative and focused on enhancing overall military effectiveness.

16. Further, framework for military innovation in the Armoured Corps of a developing country typically involves several key components such as:

a. **Assessment of Threats and Challenges**. Identify and analyze the specific security threats and challenges the county faces. Understand the nature of conflicts and the role of Armoured Corps in addressing these challenges.

b. **Strategic Objectives**. Define clear strategic objectives for the Armoured Corps, aligning with the broader national security and defence policies.

c. **Technology Acquisition and Development**. Assess and acquire modern armoured vehicles and technologies that suit the countries requirements. Invest in research and development to develop indigenous armoured capabilities.

d. **Training and Skill Development**. Provide comprehensive training for Armoured Corps personnel to operate new technologies effectively. Develop specialized skills to maximize the capabilities of armoured units.

e. **Doctrine and Tactics**. Develop innovative doctrines and tactics that leverage the strengths of Armoured Corps. Adapt to evolving military strategies and incorporate lessons learned from past conflicts.

f. **Collaboration and Partnerships**. Establish collaborations with other nations, defence contractors and international organizations for knowledge sharing and technology transfer. Participate in joint exercises and training programmes with allied forces.

g. **Logistics and Maintenance**. Develop a robust logistics and maintenance framework to ensure the sustained operational readiness of Armoured Corps.

h. **Budgeting and Resource Allocation**. Allocate sufficient resources and funding for the modernization and development of the Armoured Corps. Prioritize investments based on strategic needs and the evolving security landscape.

i. **Adaptability and Flexibility**. Foster a culture of adaptability and flexibility to respond to dynamic and unpredictable situations. Regularly assess and

update the military innovation framework to incorporate emerging technologies and lessons learned.

j. **Strategic Communication**. Communicate the importance of military innovation to the public and stakeholders. Build support for defence initiatives and investments in Armoured Corps.

17. Implementing these elements within a comprehensive framework helps ensure that military innovation in the Armoured Corps of a developing country is strategic, effective and responsive to the evolving security environment.

SIGNIFICANCE OF FORCE PREPARATION AND INNOVATION

18. Armed Forces fighting power consist of a conceptual component, a moral component, and a physical component. Fighting power is developed for force preparation, which is a continuous process of manning, equipping, training, and sustaining the Army for operations. Force preparation is common to the whole Army and force preparation is based on all the components of fighting power. In that, equipment and material preparation, collective training, and bringing units up to strength in manpower and equipment are vital factors. Manpower and equipment bring up to as a deployable force that comes under sound training. In this context, soldiers are trained in a specific role, individually or as a part of a team to equip them with essential skills like physical fitness, shooting, and fieldcraft for effective performances. It is fathomed during initial training and continues throughout his career and makes him a professional soldier (ADP Operations, 2010).

19. All three component of fighting power denoted the force preparation of particular army, force preparation is a continued with involving with manning, equipping, training and sustaining process. Force preparation is having positive correlation with force preparation of a regiment. Thereby, SLAC also required to embarked and continue the process of manning, equipping, training and sustaining process which facilitate to address challenges of fighting power of armour.

20. Manning is mainly involving with recruitment process of the Army. However, due to lack of social recognition for military service, better and more attractive employment

opportunities in other sectors, negative experiences shared by veterans, limited job opportunities after retirement and lack of awareness and exposure to Armoured Corps are the main reasons to reduce the recruitment. However, with the holistic approach collaborated with Army required to address this issue. Specially, use of social media platforms to aware the benefits of welfare facilities, salary increments, training opportunities in locally and overseas.

21. Equipping is involving with procurement and maintenance, SLAC faces a higher demand of upgrading of its existing tank fleet and acquisition of new equipment's for the RFT regiments. Further, lack of spare parts is major issue to continue with regular maintenance. When the existing inventory out dating due to modern innovations of MBT and APC procurement of required spare parts is a difficult process. However, to overcome these existing challenges in equipping process to be addressed by comprehensive analysis on indigenous innovations to either upgrading the existing tanks, APC fleet and made of indigenous spare parts with the assistance of civil sector.

22. Training is the main factor to retain the SLAC as professionalize and formidable force which can face to contemporary threats as a versatile force. However, after the 2012, with the restrictions imposed on training become a one of the main challenges to SLAC. Being a soldier or officer of SLAC practical training is an important aspect to build the confidence of individual. In that conducting live firing is an essential training opportunity for trainee to fathom his theoretical knowledge and practical experience. To further understanding of the negative impact of less training opportunities can be explained with use of course attendance from the second half of the year 2012.

Course	Year								No of Students
(a)	2012	2013	2014	2015	2016	2017	2018	2019	(c)
	(b)								
YO Course	11	12	18	10	-	13	-	10	74
Basic Operator	13	19	26	26	22	33	24	22	185
Tank Commander	14	20	14	14	18	10	9	-	99
Basic Tank operator	13	19	26	26	22	23	24	22	175
Class I	26	42	68	127	92	91	32	30	508
Total attendance									74 x967

Table 1 : Course attendance from 2012 to 2019
Source: Course Description ACTC 2020

Source: Course Description ACTC 2020

23. As per the above table, 74 officers were selected for various courses, of which those who selected for YOs got an opportunity to conduct tank live-firing. Similarly, out of 967 ORs, only those who selected for the foreign courses got an opportunity to attend live firing. Moreover, 508 operators categorized as Class I did not receive any chance to fire a single round.

24. Sustaining is about enhancing resiliencies of forces in terms of men and materials for any contemporary challenges. Resiliencies ensure the particular force to face the varying circumstances for a longer time period without reducing the effectiveness. SLAC also need to ensure its sustaining role as a formidable force. This involved not only logistics aspects of managing the supply chain for resources such as fuel and ammunition but also morale and welfare aspects of soldiers to be addressed. Moreover, requirement of fuel and ammunitions are becoming scarce resources which limiting the resiliencies of forces. However, without Halfling on the scare's resources need to address through the innovations to ensure the sustainability of the SLAC. Following tabular will explain the relationship between force preparation and innovation.

ATTRIBUTE	FORCE PREPARATION	INNOVATION
(a)	(b)	(c)
Adaptability and Modernization	Involves organizing, training and equipping military units for various scenarios	Drives the development and integration of new technologies and tactics
Technological Advancement	Ensures that military forces are equipped with the latest technologies for enhanced capabilities	Involves the continuous development and implementation of cutting-edge technologies to maintain a operational advantage
Training and Doctrine	Emphasizes training programmes to ensure skill and readiness	Can influence changes in military doctrine and training methods to

		adapt to evolving threats and technological advancements
Operational Effectiveness	A well-prepared force is more capable of executing missions effectively	Contributes to improved operational effectiveness by introducing novel strategies, tools and approaches
Risk Mitigation	Focuses on identifying and mitigating risks through training and planning	Offers new solutions and capabilities to address emerging threats and challenges
Operational Advantage	A prepared force forms the foundation for achieving operational objectives	Provides the means to gain a competitive edge and stay ahead of adversaries

Table 2 : Relationship between force preparation and innovation.

Source: Three frames for innovation policy 2018.

INNOVATION AND TRENDS IN ARMOUR

25. Prioritizing innovation is important process succeed the entire military innovation process. It involves identifying and focusing on the most impactful and relevant ideas for a specific country. This process ensures that resources are efficiently allocated to address the country's unique challenges and opportunities, ultimately leading to the development of solution that aligns with its need's priorities. Further, prioritizing military innovations is crucial for a country's defence strategy. It involves strategically assessing and selecting advancement that enhance national security, military capabilities and preparedness. This process considers geopolitical threats, technological advancements and the specific defence needs of the country. By allocating resources to the most critical innovations a country can strengthen its military effectiveness, deter potential adversaries and adapt to evolving security challenges ensuring a robust and tailored defence infrastructure.

26. However, in South Asia, India, Pakistan and Bangladesh army's prioritization of military innovations mainly focus on threat based. Somehow rather, those friendly foreign

countries manage to excel in training soldiers with modern innovations, especially use of simulators for the purpose of training. Presently, there main concentration to upgrading their military inventories and purchasing of sophisticated equipment.

27. Recently, In Bangladesh Army they conducted a modification of Chinese type 59 tank. Currently this tank is known as Medium Battle Tank T-59 Durjoy. Durjoy MBT is comparable to third generation Chinese MBTs. The tank was upgraded after 2015 in Bangladesh. The Tank was upgraded at ordnance depot factory at Dhaka with the help from NORINCO. Total 174 tanks were upgraded. Type 59 G Durjoy is heavily inspired from Chinese ZTZ 96 tanks. This upgradation programme was mostly taken to counter T-72 tanks of neighboring countries and to ensure the durable life time of Type 59. Bangladesh has about 300 Type 59 tanks in its inventory and those tanks are gradually getting upgrading.

28. Most of the upgrades were considered the mobility, fire power and protection. For mobility they replaced with 4 stroke water cooled exhaust steam turbine diesel engine with 730 horse power (HP) at 2000 RPM and 2 turbo charges instead of 520 HP at 2000 RPM. Further, type of gear control, clutch control and steering control mechanism upgraded to hydraulic assisted mechanical control. In relation to fire power, main gun is a 125 mm smooth bore bore gun with fully stabilized and gunner sight is also stabilized as well. It uses the same gun as MBT 2000 and ammo stowage can storage 28 rounds with semi auto loader assisted with computerized fire control system with thermal imaging (TI) and laser designator, it has VRC 2000L radio systems for communication and its range is 30 km.

In the protection aspects base hull armour is same as original type 59 but the hull now has Modular composite armour and Explosive Reactive Armour (ERA) on front. Turret has been changed to a new turret build with modular composite and applique armour.

29. According to the request for information issued by Indian Army they have planned to Overhaul T-72 tank fleet programme for restoration and life extension of the tank. This process comprises striping of the tank and include 100 % replacement of parts that have limited shelf life. The ERA mk II demonstrated excellent performance against shaped charge warheads and kinetic energy projectiles, surpassing the capabilities of its predecessor, the ERA mk I. The decision to upgrade the T 72 tanks with the ERA mk II underlines the Indian Army's commitment to enhancing the protection and combat capabilities of its armoured fleet (IDRW 2023).

30. Further, by focusing on Future Main Battle Tank (FMBT) and with having aims to create a modern, formidable battle tank to meet the evolving needs Indian Army plan to upgrade the power pack of T-90 MBTs. In that one of the key enhancements involves replacing the existing V-92S2 engine (with 1000 HP) with a new power pack that will deliver nearly 1500 HP. This significant boost in engine power is expected to provide Indian T-90 s with improved mobility and agility on the battlefield. Moreover, as part of the its upgrade plans, Indian Army is focusing on approximately 1670 T-90 MBTs to upgraded its firepower and survivability. These upgrades aim to not only boost firepower but also increase survivability and address design flaws that have been exploited in recent conflicts involving Western supplied Anti-Tank Guided Missiles (ATGW).

31. Beside the tank upgrading programme Indian Army contributed adequately to beef up the training aspects too. Specially, Indian Army has been introduced simulator technology for the tank crew training for T-72 and T-90 MBTs. They have embarked on Crew Gunnery Simulator (CGS) for T-72 and T-90, driving simulators (DS) for T-72 and T-90 and Gunnery simulator (GS) for T-72 and T-90 which is comprehensive simulator designed to train both commanders and gunners of MBTs enabling skill development from basic to advanced levels. It comprised with interactive controls familiarization, gunnery drills and procedures, Target acquisition and engagement.

32. Based on information related to innovation and growth of neighbouring countries such as India and Bangladesh Army, their innovation primarily focuses on threat-based enhancements and increasing the life expectancy of existing armoured fleets. However, when compared to SLAC, we cannot pursue a similar upgrading programme with regards to complete upgrades. This is because, as an island nation, we are mostly free from potential traditional threats. Therefore, SLAC's innovation priorities seem to be more focused on training-related innovations. Due to various restrictions as mentioned above, there is a significant requirement for innovation to be more closely affiliated with training aspects. This will help maintain a professionalized and formidable armored fighting power.

33. Sub-Caliber training for tank crews typically involves using a smaller caliber weapon (.22 weapon), often a dedicated sub-caliber device or gun, to simulate firing the main gun of a tank. This allows crews to practice gunnery skills, target engagement and coordination without the cost and logistics of using live ammunition. Sub-Caliber devices are usually mounted on

the tank's main gun, providing a realistic training experience while minimizing expenses and environment impact. The training focuses on accuracy, target identification and efficient communication among crew members. Further, following advantages can be identified:

a. **Cost-Efficiency**. Using smaller caliber ammunition is significantly less expensive than firing live rounds from the main tank gun. This allows for more frequent and extensive training within budget constraints.

b. **Logistic Convenience**. Sub-Caliber training reduces the need for transporting and handling large, heavy live rounds. This simplifies logistics, making training exercises more manageable and safer.

c. **Environmental Impact**. Live firing generates noise, exhaust and environmental impact. Sub-Caliber training helps mitigate these effects, making it more environmentally friendly and suitable for training in a wider range of locations.

d. **Enhanced Safety**. Working with Sub-Caliber devices reduces the inherent risks associated with live firing, making training safer for both crew member and instructors. It allows for detailed practice in a controlled environment.

e. **Increased Training Frequency**. Due to lower costs and logistical demands, tank crews can engage in Sub-Caliber training more frequently. This increased repetition enhances muscle memory and overall proficiency.

f. **Target Variety**. Sub-Caliber training often involves specialized target system, enabling crews to simulate engagements with different types of targets, including moving targets, without the need for live ammunition.

g. **Maintenance Efficiency**. Frequent live firing can accelerate wear and tear on tank components. Sub-Caliber training minimizes this wear, helping to extend the lifespan of the tank's main gun and associated systems.

h. **Training Scenarios**. Sub-Caliber devices allow for the simulation of various scenarios, including different distances, terrain types, and environmental conditions. This versatility contributes to more comprehensive and realistic training experiences.

34. In summary, Sub-Caliber training provides a cost-effective, safe and environmentally conscious way for tank crews to fathom their skills, ensuring they remain proficient in

operating the main tank gun without the logistical challenges and expenses associated with live firing.

35. Moreover, most of the modern battle tanks consist with an Auxiliary Power Unit (APU) is a secondary engine that provides power for various onboard systems when the main engine is not running or when the vehicle is stationary. It typically runs on diesel fuel and is designed to generate electricity and hydraulic power. The APU helps conserve the main engine's fuel and reduces wear and tear during idle periods. Additionally, it ensures that critical systems like communication, navigation, and weapon systems remain operational even when the engine is off.

36. However, specifics of an APU in a tank or APC can vary based on the vehicle model and manufacturer. Generally, key features may include:

a. **Power Generation**. The APU generates electrical power to sustain on board systems such as communication equipment, sensors and navigation devices when the main engine is not operational.

b. **Hydraulic Power**. In addition to electricity, some APUs provide hydraulic power to support auxiliary systems like turret elevation and depletion, weapon system or other hydraulic dependent functions.

c. **Fuel Source**. APUs commonly use diesel fuel, as it is a standard and easily accessible fuel type. This fuel efficiency helps in conserving the main engine's fuel.

d. **Reduced Signature**. APUs are designed to operate quietly and with a lower thermal signature, making them suitable for situations where stealth and reduced detectability are essential.

e. **Automatic Start/Stop**. APUs often have an automatic start/stop feature, activating when required and shutting down when not needed. This helps in energy efficiency and minimizes unnecessary fuel consumption.

f. **Cooling System**. To prevent overheating, APUs are equipped with cooling systems to maintain optimal operating temperatures.

g. **Compact Size**. Given the limited space available in an APC or tank, APUs are designed to be compact and lightweight while still delivering sufficient power.

37. Besides, the technological advancements of armour, discussing of its employment in different scenarios is essential under existing conditions in Sri Lanka. APC are the most

effective equipment to employ against non-traditional threats. Especially in peace time operations, the use of APCs becomes predominant when supporting civil authorities through tasks such as populace and resource control, military civil action, and providing aid in national disasters or emergencies. APCs can play a vital role in responding to natural disasters by providing mobility, protection, communication and other support capabilities. In disaster-stricken areas, APCs can be employed for various tasks:

a. **Search and Rescue Operations**. APCs can navigate through challenging terrains, such as flooded or debris-laden areas to reach affected areas quickly. It facilitates the extraction of people stranded in remote or hazardous locations.

b. **Evacuation and Transportation**. APCs can transport people, including casualties and survivors, safely to designated evacuation points or medical facilities. The armoured protection ensures their safety in unstable environment.

c. **Supply Distribution**. APCs are capable of transporting essential supplies, including food, water and medical aid to areas cut off from conventional transport routes. This helps in delivering timely assistances to those in need.

d. **Medical Support**. Some APCs are equipped as mobile medical units, providing on-site medical care and treatment. This is particularly beneficial in areas where traditional medical facilities may be inaccessible or overwhelmed.

e. **Communication and Command Centres**. APCs can serve as mobile communication hubs and command centres, enhancing coordination among relief agencies and improving the overall efficiency of disaster response efforts.

f. **Security and Law Enforcement**. In the aftermath of natural disasters, maintaining law and order becomes crucial. APCs can be used for patrolling affected areas, preventing looting and ensuring the security of both responders and survivors.

g. **Infrastructure Repair**. APCs equipped with engineering capabilities can assist in clearing debris, repairing roads and restoring basic infrastructure contributing to the overall recovery process.

38. In essence, the versatility and mobility of APCs make them valuable assets during natural disasters, allowing for a rapid and effective response to alleviate the immediate impact and support recovery efforts.

EXISTING AND PROJECTED INNOVATION FOR SRI LANKA ARMOURD CORPS

39. Presently, in Sri Lanka Armoured Corps focus their innovation and growth towards to building of indigenous APC and tank simulators to uplift the skills of soldiers. Due to existing constraints of tank ammunitions, fuel, equipment wears and tear and firing range cause to depleting the skills of solders in turn which effect on professionalism of Sri Lanka Armoured Corps. However, despite the painstaking efforts and dedication to maintain its status as a formidable force amidst various challenges, the Sri Lanka Armoured Corps has undertaken rigorous efforts to embark on a new phase of development. This phase entails focusing on the creation of indigenous military technology for armor, including the construction of a BTR simulator and laying the foundation for a T-55 tank simulator.

BTR SIMULATOR

40. Armoured Personnel Carriers (APCs) crew training is limited due to the high cost involved in live training sessions. The main objective of a Simulator is to provide a lowcost indigenous solution to train the BTR-80A APC crew of the Sri Lanka Armoured Corps. It has been designed with the virtual concept by simulating functions on a virtual APC and operating it on a virtual terrain. This virtual APC is animated by feeding real-time information from complex hardware and software setups. The hardware setup has been developed by using an abandoned BTR-80A APC. The electronics give real-time information on the operations of each important sensor mounted part of the APC. This information is processed in a software platform and fed into the virtual APC to animate the APC according to the real-time information.

41. The APC, Main Control Station and Dome Screen Projection are the three main sections of this system. The main control station controls the power and software of the system. Driver is equipped with almost every driving option in the APC. Gunner is equipped with the 30 mm main gun and the supporting PKT gun by simulating realistic weapon characteristics, ballistics, time of flight, blasting effects and natural sounds. The Commander can observe targets, judge distances to respective targets and instruct the Gunner. The Instructor's Panel is provided for the instructor to observe trainees' real-time behaviour. This simulator system provides a low-

cost indigenous solution to train the APC crew of the BTR-80A APC. As a result of this solution, environmental pollution also can be reduced.

42. Crew Gunnery Simulator for T-72 Tank (T-72 CGS)": This product was introduced by Zen Technologies Limited. T-72 CGS is a comprehensive simulator designed to train both Commanders and gunners of Tank T-72, enabling skill development from basic to advanced levels. They have included all the interactive controls like instruments, indicators and gauges in the gunner compartment, Gunner's Sight TPDK-1, Commander Sight TKN 3B and all gunnery-related controls in Gunner and Commander sections. Also, they have developed the jerk on main gun firing (Zen, 2006).

43. The designers have facilitated the Gunner and Commander but not the Driver. Hence, the whole crew cannot be trained by using this Simulator. But in the BTR 80A Armoured Personnel Carrier Simulator, the driver section, gunnery section and commander section are included and simulated. Hence, the whole crew can be trained simultaneously. The digital environment of the BTR 80A Armoured Personnel Carrier Simulator reduces the long-term expenditure. This research mainly aims to create a simulator solution to reduce several problems, on field training sessions. Mainly hoping to reduce the cost of ammunition, fuel, training cost and maintenance cost. The Simulator offers trainees a realistic and immersive environment in order to practice and improve their responses and decision-making skills. This powerful simulator-based training platform may not offer a 'real-life' experience. The simulators allow trainees to practice in a variety of different scenarios and environmental conditions that they may never encounter during on ground training. Hence, this is a financially beneficial and effective training simulator to train trainees of the Sri Lanka Armoured Corps.

TACTICAL SIMULATOR FOR T - 55 TANK CREW

44. The project involves designing of a simulator station with 3 tank models of T 55 Tank. The simulator will be used to practice joint crews within a tank as of a real tank and the simulator will be facilitated to train three independent teams simultaneously.

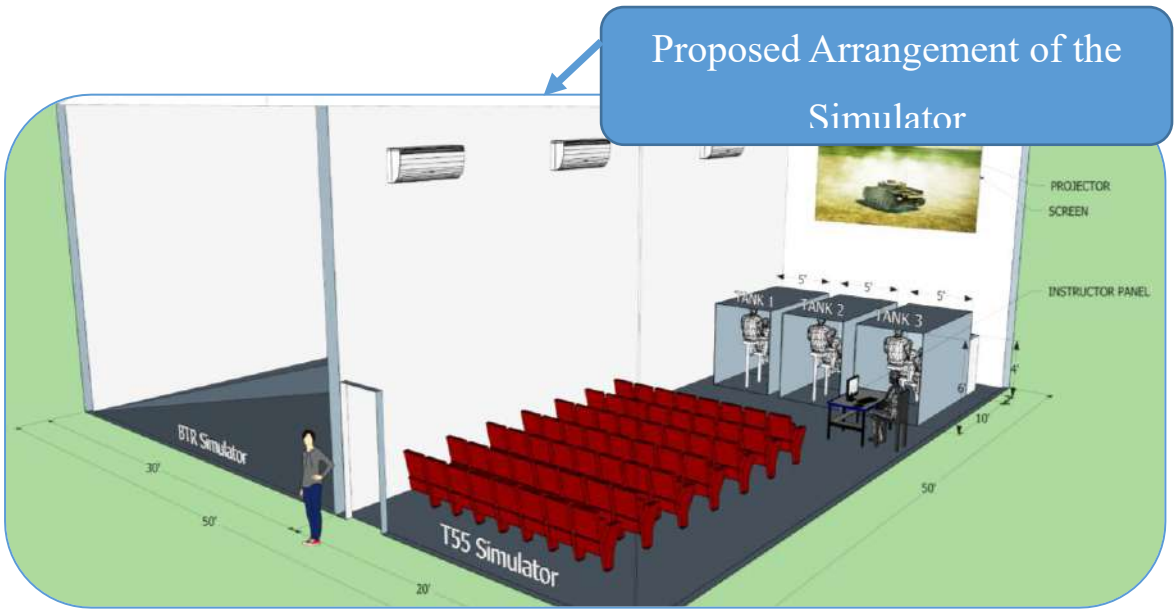

Figure 1: Proposed arrangement of the simulator
Source: CDRD

45. Three tanks will be operated in one virtual environment. The simulator will be used to practice tank to tank tactical battle scenarios in virtual combat missions as of a real battle. Realistic sounds (Engine, Firing, etc.) will be generated to give a realistic feeling to the tank crew.

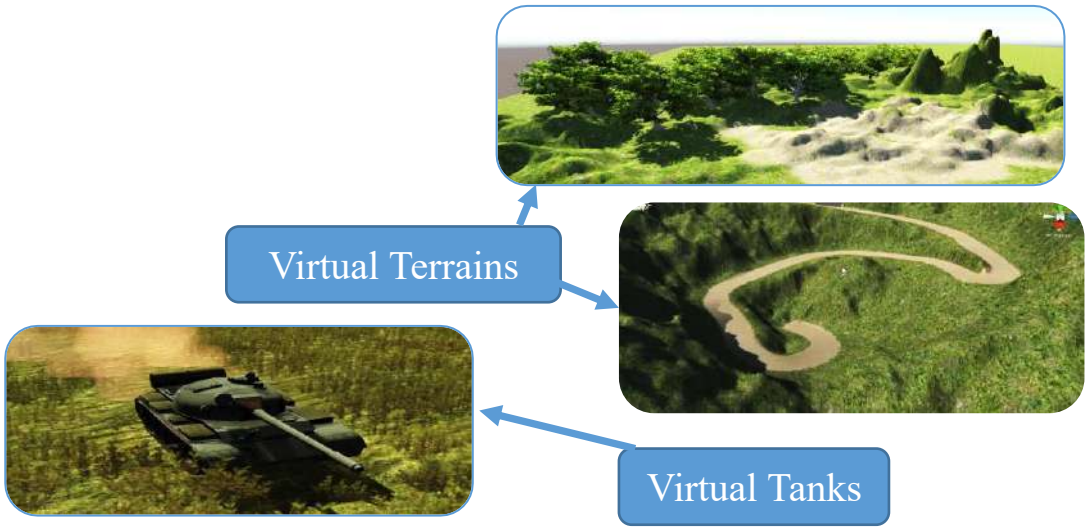

Figure 2: Virtual Environment
Source: CDRD

46. One T 55 tank model consists the main features for major roles of T 55 Tank crew (Driver, Gunner, Commander and Loader). Also, respective sights of Driver, Gunner and Commander will be incorporated by using digital screens.

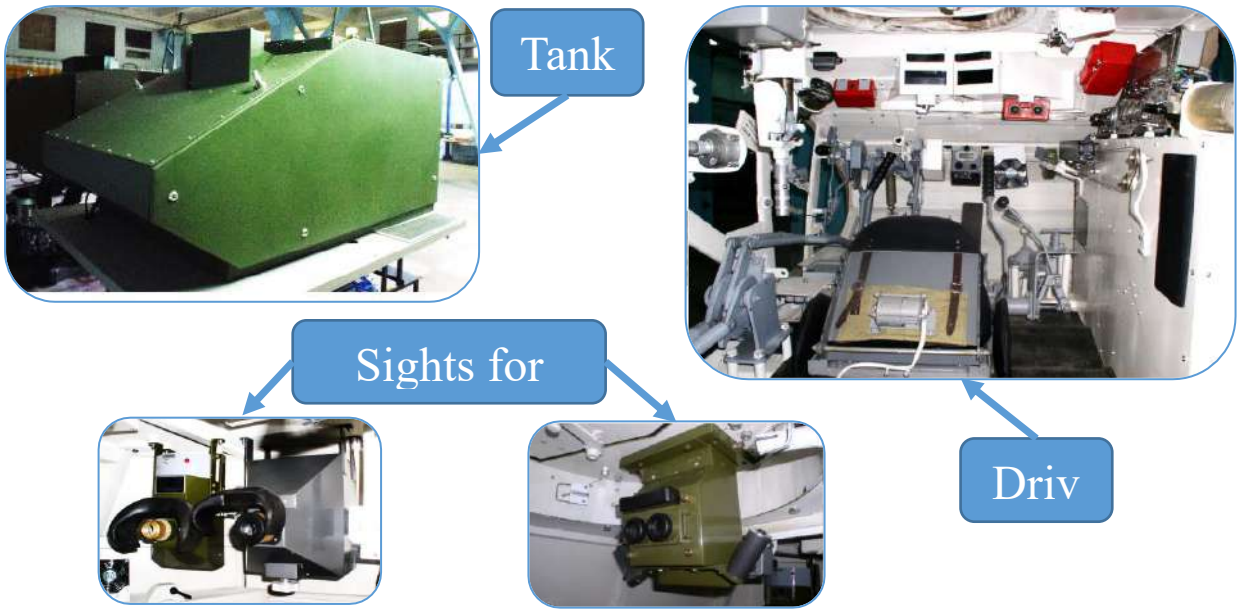

Figure 3: T 55 tank simulator compartment
Source: CDRD

SIGNIFICANCE OF THE PROJECT

47. Significance of the project listed as follows:

a. Currently there is a provision for tank crews to engage in real time training on tactical manoeuvring and exercising in command and control at combat missions.

b. Most of the tanks of the tank fleet is unserviceable and lack of spares.

c. Improve professional competency through T-55 tank crew without compromising operational tanks.

d. Transfer of experience to next generation, since experienced soldiers who had combat experience are getting retired.

e. Train the entire T-55 Tank crew, including Gunner, Driver, Commander and Loader for their respective job role.

RECOMMENDATIONS

48. Following potential innovations can be derived through the study:

a. Introducing of sub caliber firing for tank crews allows practicing gunnery skills, target engagement and coordination for tank crews to fathom their skills,

ensuring they remain proficient in operating the main tank gun without the logistical challenges and expenses associated with live firing.

b. Inducting of Crew Gunnery Simulators, Driving Simulators and Gunnery Simulator for MBT and APC to provision for tank crews to engage in real time training on tactical manoeuvring and exercising in command and control at combat missions.

c. Conducting indigenous research on introducing Auxiliary Power Unit (APU) for MBT and APC to reduce fuel wastage, generate electricity, hydraulic power and reduce the engine wear and tear.

d. Revisit the doctrines on employment of APC to effectively address the non-traditional threats in the role of assisting to civil authorities.

e. Establish research and development teams at unit levels to expand the opportunities to induct indigenous innovations.

f. To enhance the skills of soldiers and maintain professionalism, more focus should be placed on innovations in training.

g. Sharing knowledge with friendly neighboring countries such as India, Pakistan, and Bangladesh is crucial in bridging the gaps in innovation and modernization.

h. Conduct the recruitment process, using social media platforms, while emphasizing the benefits of being a cavalryman and the associated welfare facilities.

49. Provide more foreign training opportunities for soldiers and officers to be exposed to new or advanced military equipment, diverse training environments, advanced military techniques, tactics, and technologies, in order to enhance their skills, familiarity, and proficiency.

CONCLUSION

50. Innovation is a key driver for the SLAC ability to adapt, overcome challenges and contribute positively to the overall development and security of the Sri Lanka. Further, it enables the military to operate effectively in a rapidly changing global environment and to adopt advance technologies, tactics and improving the SLAC overall operational effectiveness in addressing existing and potential non-traditional threats. Further, Innovation contributes to the professional development of SLAC soldiers by providing them with training in the latest technologies and tactics making them more adaptable and skilled. Moreover, under resource constraints innovation helps in modernizing SLAC capabilities without relying solely on large budgets. This is essential for maintaining a credible defence posture.

51. Overall, innovation is about change. Innovation in the military is about staying ahead of the pace of change in comparison varying circumstances. In 1921, the father of modern airpower Italian General Giulio Douhet proposed the notion that, “Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur’’.

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THANKING NOTE BY THE COMMANDING OFFICER

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With the knowledge and skills gained from this symposium, let us collectively dedicate ourselves to the security of our motherland, the credibility of the Army, the pride of the Corps, and the esteem of our beloved regiment.

Thank you once again for your unwavering support and commitment.

Lt Col NVAM Vithanage RSP psc
Commanding Officer